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PROBLEMS OF MONOPOLY
AND ECONOMIC WARFARE

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

BY

(F.) ZEUTH L MONOPOLY

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ITS UNDERLYING

WITH A PREFACE

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BY

PROFESSOR JOSEPH A. S.

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PREFACE

By JOSEPH A. SCHUMPETER

SOME ten or twenty years ago, the state of Economic Theory was somewhat analogous to what it was during the quarter of a century which followed upon the publication of Mill's *Principles*. To the superficial observer at least, there seemed to be a tendency among many of the most competent economists to accept as "final" the fundamentals, or more than fundamentals, of our theoretical apparatus, to discourage further investigation into its time-honoured problems, and to consider further refinements as superfluous or worse. Many examples could be cited in support of this, especially among the followers of Marshall and Pareto, many of whom had got into a way of speaking as from the vantage ground of established truth, which might have to be adapted to fit particular cases, and might require modification for the purposes of practical application, but which was not itself to be questioned again: There was a belief that the great work had been done—a belief very similar to that expressed by Mill in that famous passage, which winds up his exposition of the theory of value, viz., that there was nothing left to clear up "either for the present or any other writer".

In a sense, this attitude was both right and fruitful. Great work had undoubtedly been done, and it was certainly necessary to bend to the task of defending, expounding and applying it. Yet there was some danger of petrification ahead, and the almost immediate rise of

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anti-theoretic schools of thought, especially in America, is the proof that Theory was about to pay the penalty for that air of finality which was beginning to get on the nerves of the rising generation in very much the same way as it did in the case of Mill.

I believe this danger to be passing, the danger of stagnation as well as the other one, incident to it, of loss of time and effort by needless and fruitless struggle for and against "new programmes" of one kind or another. Most of us are getting into a frame of mind equally removed from the *αὐτὸς ἔφατ'* and from restlessly changing the ground we stand on: Most of us are ready to use the tools which have been handed to us, and to accept the situation if they change their form in being used. The credit for this is first of all due to Marshall and Pareto themselves, whose very greatness consists in always having pointed to goals beyond their own realm. We have, secondly, the good fortune of having offered to us masses of materials which lend themselves already, and will lend themselves more and more, to being gripped by the arms of the theoretical engine. And we have thirdly, the merit of recognising the particular points in the work of those who went before us which most urgently want to be improved.

One of these points, second to none in practical importance or scientific interest, is the theory of monopoly, which at the same time is the *most* and the *least* satisfactory part of our organon: There is, on the one hand, no chapter of general theory which could in rigour of argument or elegance of exposition be compared to the Cournot-Marshall-Edgeworth-Amoroso treatment of the case of one monopolist dealing with a perfectly competitive crowd on the other

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side of the market. But there is also, on the other hand, no other chapter so full of inconclusive controversy and uncertainty of results as the treatment of all those cases which cover the whole of the phenomena between the limiting cases of perfect competition and "pure" monopoly, i.e., practically the whole of the reality of markets. It would indeed be most unjust to say, that Theory still considers competition as the normal case and everything else as mere deviations from it, which could be taken care of by a few remarks here and there: The importance of the competitive case is not dependent on any hypothesis about its being the rule in real life, but rests with certain properties of it which would make it a useful starting point of analysis even if reality had never displayed any approximate instance of it. Yet much of what is not merely prejudice and misunderstanding in the charges of "unreality" or uselessness, which always have been, and are being now, levelled against our science, can be traced to our habit of brushing aside, as it were, that vast mass of facts and problems even when speaking of questions of practical policy. It is here, if anywhere, that our teaching should not be left as it is and here, if anywhere, that we have every reason to do our best to give to "factual" research that aid which it is entitled to expect from the theoretical engine, if its devotees are not to turn their backs on it as they did fifty years ago.

For these reasons as well as on account of its merits, I am anxious to recommend the present book to the attention of students and also of that wider circle of readers whom Marshall used to call "business-men". It is both a timely and an eminently useful contribution. Whilst it offers much that is original and sure to become matter of

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fruitful discussion, I believe it at the same time to be the best introduction to the subject we have. That lightness of touch, which comes from a perfect command of scientific technique, makes it pleasant reading even in its more difficult parts, and enables the author to meet at the same time the requirements of a monograph and a text-book. Even so, of course, the general reader will have to make up his mind, whether he wants *simple* answers to his questions or *useful* ones—in this as in other economic matters he cannot have both.

Naturally, the "text book character" of the work before us is most in evidence in the introductory chapter, which deals with familiar subjects so well as to give them the freshness of novelty. The author then proceeds to more debatable ground: The second and the third chapters attack the thorny problems of "Monopolistic Competition" and of "Bilateral Monopoly", which we find it so difficult to agree about—and in the treatment of which we are constantly reproaching one another, and even the shining lights of Cournot and Edgeworth, for mistakes and misunderstandings. One is almost reminded of that humorous saying of W. K. Clifford, the philosopher, about the state of things on a very different battlefield, "that the matter is such, that it is particularly difficult to make out not only what other people mean, but what one means oneself". Dr. Zeuthen goes to the root of the perplexities by stressing the importance of clearly distinguishing the hypotheses peculiar to every one of the many possible cases and of working out a great number of possible types of behaviour. In fact, there are *some* hypotheses which would spell indeterminateness even in a régime of competition. If, e.g., we

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have a perfectly competitive "apple-and-nuts-market", but allow people to feel their way by means of actual transactions distributed in time, quantities exchanged and the final rate of exchange will not be uniquely determined but depend on the situation created by the first transactions. Other hypotheses, inadmissible in the case of competition, yield undoubtedly indeterminate results. But the point is that there are still others which do not.

Why is it now, that there are so many possible cases to be considered, if we want to deal successfully with "monopolistic competition" or "bilateral monopoly", while we find no difficulty in framing but one fundamental case from which to start in dealing with a competitive market? The answer to this question leads up to the element of truth contained in the general proposition, that price in monopolistic competition or bilateral monopoly is indeterminate: In a competitive market people not only have a *motive* to act as they do, but they cannot, without incurring heavy penalty, act differently. Everyone of a small number of big buyers or sellers, and both of two monopolists facing each other, are in a different position—in the position of being able to *change*, instead of having to *accept*, the fundamental data of the situation, to take account of a distant future, to act on non-economic considerations and so on: Even downright foolishness, the rôle of which may in the first approximation be neglected with a competitive market, has so much more scope in these cases as to become, sometimes, an important factor even in the long run. Yet all this is equally true of simple monopoly. In this case, too, we ought to recognize that price and quantities are not determined in the same sense and with the same stringency

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as in a régime of competition. And if this does not prevent us from speaking of one determined "monopoly price"—which we all do, even sometimes overlooking the possibility of several or many prices yielding the same monopoly-revenue—it seems to follow that it ought not in the cases before us prevent us from trying to answer what, then, turns out to be the relevant question: Properly choosing well defined sets of reasonable assumptions, do we get determined results in the same sense as in the case of simple monopoly, or are we driven to the Edgeworthian conclusion that, as far as purely economic forces go, there is nothing but "chaos"?

Dr. Zeuthen's argument does much to clear up this question. A large group of cases emerges, for various reasons not without claim to the epithet ornans "normal", which undoubtedly yield "determinateness" of equilibrium. Roughly speaking, this group consists of those cases in which each party reacts on what the other does, simply by adjusting the quantity it is willing to supply. There seems to me to be great merit in proving this, and to draw a strong dividing line between such cases and those other ones in which parties to a bilateral monopoly try to fight each other, or dictate their terms to each other, by entirely withdrawing, or threatening to withdraw, what they control—the cases of "Economic Warfare" as the author calls them. Nothing of like interest or importance has been written on this latter subject since Professor Pigou's "Methods of Industrial Peace". Not all of those who perfectly agree with Dr. Zeuthen's first three chapters will be equally willing to follow him through the fourth, in which, after having very properly started from the "range of possible bargains", he endeavours to narrow down that

PREFACE

range—in the limiting case to one point—by considerations of cost and unpleasantness of struggle and of possibility of success: Some of us will find that irrational elements enter too largely into proceedings such as, e.g., a general strike to allow quantitative treatment. Yet, even the sceptic cannot fail to benefit by this bold raid into new and difficult country. Besides, do not some of our hopes for the future turn on a belief that, like so many other things in life, Economic Warfare will increasingly be rationalized in time? And if so, is it not the duty of science to try to precede practice rather than follow it?

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AUTHOR'S PREFACE

THE present volume treats of a group of problems arising when competition is either precluded or limited. The introductory Chapter I deals with absolute and limited monopoly, Chapter II with cases in which a few enterprises compete, and Chapter III with those in which two or three enterprises or organisations face one another as buyer and seller. In continuation hereof Chapter IV treats of cases of the latter kind in which an adjustment by variation in sales is not possible, but the settlement is made by means of stoppage or threats of stoppage. The underlying general problem is the price in markets where there is only a limited number of enterprises—the very important problem which was dealt with already in 1838 by Augustin Cournot.

Chapters I and II have already been published in Danish in *Nationaløkonomisk Tidsskrift* 1929, under the title “Mellem Monopol og Konkurrence” (Between Monopoly and Competition), and Chapter IV has been published, though in a somewhat different and shorter form in *Archiv für Sozialwissenschaft und Sozialpolitik*, 1929, as well as in my book “Den økonomiske Fordeling” (Distribution of Wealth), 1928, in which the other problems have also been briefly discussed.

The translation has been undertaken by my wife, Else Zeuthen, M.A., with the assistance of Mr. K. I. Wiggs, B.Econ., London. The Rask-Oersted Foundation has given a grant towards the publication of the book.

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PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

CHAPTER I

INTRODUCTORY

I. THE PROBLEM

IN politics and popular discussions one often encounters very crude conceptions of competition and of monopoly. People either conceive of perfectly free competition or of absolute monopoly such as fixed cartels and gigantic trusts in full control of a certain trade within some extensive sphere. In economic text-books also, corresponding simple theories form a main part. Even if experience forces one to admit that some great enterprise or combination may exercise a certain limited influence, very few attempts are made to tackle the problem. Generally, economic theory deals with nothing but extremes—those of absolute monopoly and of unhindered competition, whilst the space between them, comprising all or most of the actual economy, is either abandoned as quite indeterminate or it is left to the reader to guess where the result will fall. Economists can do this with a very good conscience, since some of the greatest authorities actually emphasise the indeterminateness of this sphere. The same feature of apparent indeterminateness that prevails in the case of competition between a few enterprises is also to be found in another instance, very common in real life, the one in which two monopolies face each other as buyer and seller.

. PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

Both the theory of economics, as well as the popular conceptions are based essentially upon the English classical theory of competition, of which monopoly forms an exception. This was natural at a time when, owing to the development of transport and Liberal legislation there was a tendency away from monopoly towards competition. It was thought that if your theory was not universally true, it would become so when your political ideas had been realised. Later, the development resulting mainly from the increasing importance of the large-scale unit has gone in the opposite direction, and political theories such as those of the Socialists, based on classical economics, favour large and unconditional monopolies, which by a simple act of legislation can be abolished or transformed for the benefit of the community as a whole. The development of the last century has in some cases led to competition which has caused the decay of the old-fashioned markets that consisted of one or a few local enterprises. In other cases, competition has been superseded by a few large concerns or combinations. The result is that market conditions are constantly varying, and that prices are generally fixed in a *composite market*. One or a few enterprises are nearest to the individual buyer, either in the strictly localised sense, or as regards the quality of the commodity. Sometimes this narrow market is safely entrenched behind high walls, whilst at others slight differences in price will suffice to attract additional buyers or sellers. The greater the difference in price, the more extensive will be the competition both from the point of view of locality and quality, whilst at the same time, some of the enterprises will continue, within a certain limited scope, to enjoy the advantage of being the nearest.

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As early as 1838 Cournot set forth a theory concerning the determination of prices in markets with a limited number of independent undertakings, and a gradual transition from absolute monopoly to pure competition according as the number of competing enterprises increased from one to many. The sympathies of economists were, however, chiefly enlisted on the side of competition, and moreover, the monopoly theories of Cournot and later authors were usually enveloped in complicated higher mathematics. The same was the case with the very authoritative criticism of the theory of price determination in markets with a few competing units. The great majority of economists have been too easily satisfied with the results of this criticism, overlooking the great realities underlying the elaborate calculations of the mathematicians. Consequently, there have been insufficient opportunities for a thorough discussion of the essence and underlying conditions of monopoly and competition. It is not possible, however, to illustrate the theory entirely unaided by mathematics, because it is a question of rather complicated quantitative relations. In the following, I have endeavoured to give simple graphic illustrations which, I dare say, most economists will be able to follow without much difficulty. The author has mainly emphasised the different possibilities, which the choice of hypotheses affords.

This investigation is chiefly dedicated to business economists and other intermediaries between economic theory and actual trade, who are poorly served by the ordinary theories of competition and simple monopoly, and who, on the other hand, have the best possible opportunities of verifying the assumptions and results of the theories of monopolies.

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The present volume deals chiefly with selling monopoly, although it will hold good for that of buying also. We find monopolies, partly in the market of commodities, in which both producers, wholesalers and retailers, are concerned, and partly in the market of labour and other services of production ; consequently, the theory of monopoly applies to all these spheres.

Generally, the manner of dealing with the subject in the present treatise is rather casuistic, the different problems being illustrated by a number of concrete graphical examples. I have done so because, as an introduction to the theory of monopoly, the main point is to survey what may possibly happen and, moreover, because one must be cautious in setting forth the general thesis. The greatest importance has been attached to the determination of prices, whereas the important technical problems of concentration have been almost completely left out.¹

Simplification and abstraction are necessary, in order to bring out as clearly and comprehensibly as possible the quantitative relationship between the different forces at work. The results of the individual enquiries can, therefore, no more than the classical theory of competition, be directly applied to real life. The method is useful, at any rate, in elucidating certain essential features of the more complicated actualities of life, however. In any case, analogies from the simplified instances dealt with below may impart to the reader a useful caution, when considering the theory of unlimited competition, and a general idea of another type

¹ A number of related and present-day problems have been dealt with by various authors in a series of articles in the *Economic Journal*, on stability or instability of competition and capitalism, increasing returns, the non-existence of the representative firm, etc.

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of economic causation. The point is, instead of a price theory which reckons with large markets comprising large and uniform quantities of goods and services fetching the same price, to substitute one based on the relation between those enterprises or other economic units that are nearest to one another, i.e., a kind of atomisation of the economic causation. The special circumstances in the small markets and in the many individual enterprises will thus influence prices, sales, and especially profits. It is true that the approximate heights of prices are determined together for large regions, but the special conditions within the many small spheres, all in all, exercise a very great influence on the distribution of income ; moreover, the effect of the large market is based on a great many relations between individual enterprises.

In our analysis of the relations between the individual enterprises, we come across (1) the special type of competition between a few enterprises (monopolistic competition) where the individual entrepreneur, like the absolute monopolist, is still to a certain extent, interested in a limitation of the sales ; (2) the special kind of adjustment when a couple of enterprises stand face to face as buyer and seller or as sellers of complementary services—bilateral monopoly ; and (3) the instances where such enterprises cannot arrive at an adjustment by means of a variation in the extent of the sales, but where the decision is obtained by fighting, or threatening to fight.

I shall conclude this introductory paragraph by a couple of quotations from *The Marginal Theory of Value*, by my teacher, Professor L. V. Birck, who is keenly alive to the practical and theoretical importance of monopoly : “ At a

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time when prices are not determined through free competition and by the unhampered effects of the forces, but when the producers to an increasing extent have amalgamated, and one will is commanding the output, the principal task of the theory of value will be to find the rules governing the state of the monopolised market." "The day will come when the theory of value under monopoly, if it is to treat all the possible cases of exploitation, will be quite a comprehensive volume, and even of the proportions of a Bible, when not only the theory of distribution under monopoly, but also its *financing* is included—that is, when the conditions for trade in the free market will only be treated as *propædeutics*, because they will be the exception, and for study only the means to understand the ruling manipulated market."

2. ABSOLUTE MONOPOLY

We shall begin by discussing the comparatively well-known case of *absolute monopoly*. This is the easiest approach to the descriptive method that is later applied to the more complicated cases. If we assume, as in Fig. I, that demand decreases by equal quantities according as the price is reduced by a certain amount, and if we assume constant costs, i.e., a demand curve falling in a straight line and a horizontal cost curve, the net profit of the monopolist (quantity sold multiplied by the difference between price and costs) is $q(p-C)$. Under the above assumptions this quantity will attain its maximum, $q_m (p_m-C)$, when the excess price reaches half the top price T , where the last sales disappear, and the quantity sold reaches half the quantity at the point of intersection I , at which point the last profit on the price disappears. In this case the quantity sold is

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half that sold under free competition. The rectangle indicating the monopoly profit is here half the large triangle TCI , corresponding to the profit at absolute differentiation of prices, and equal to the sum of the two small triangles. (If we substituted the centre of the line $T—I$ by another point P , the area of the rectangle indicating the monopoly profit would be smaller than the sum of the areas of the two

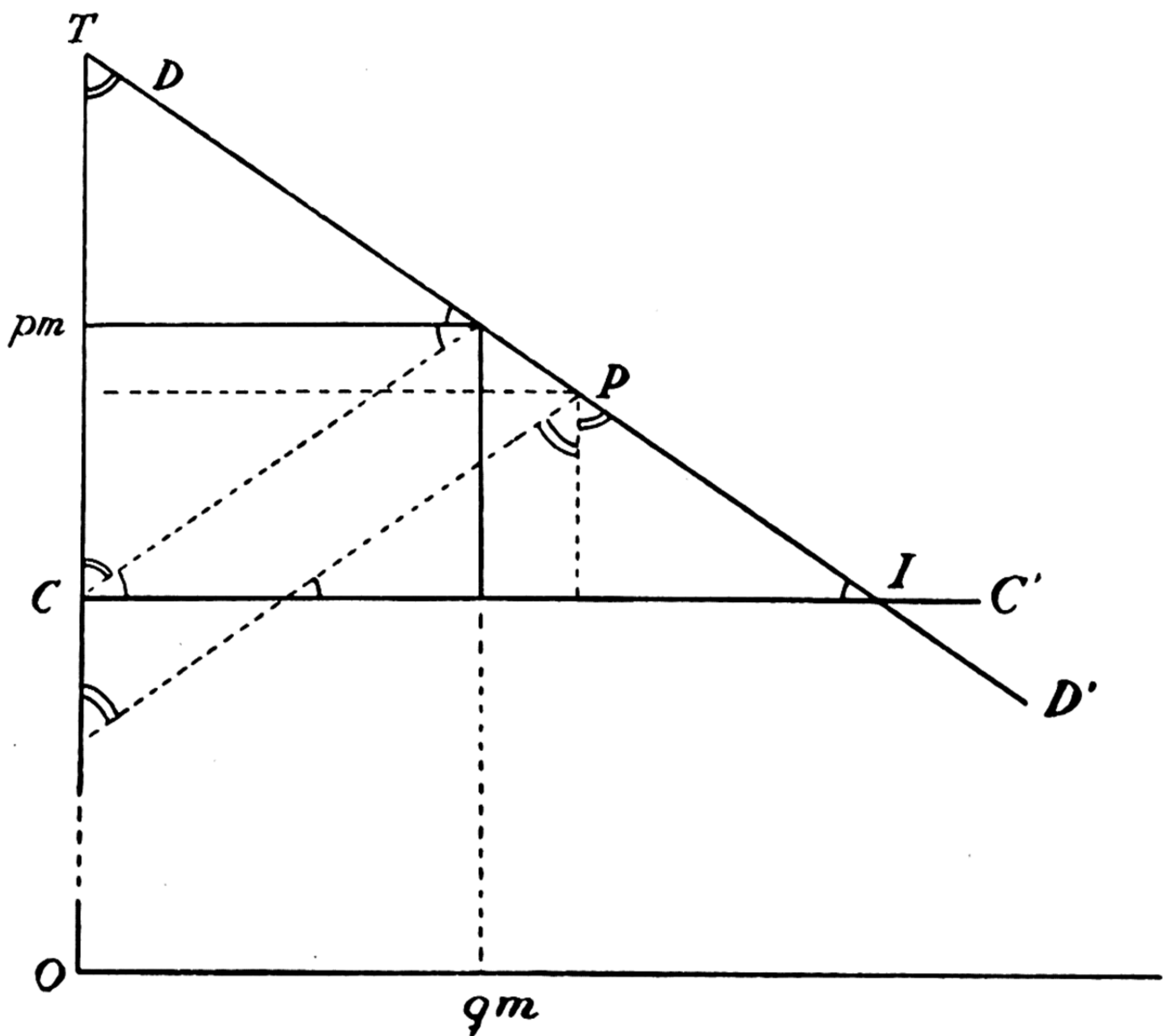


FIG. I

residual triangles. If in this case we swung the two triangles round the sides they have in common with the rectangle so that they covered it, they would do so completely, and moreover, would leave one small triangle outside its area.)

That the price and supply of the monopoly product will be found in the middle of a straight demand curve, is, of course, true, irrespective of the slope of the latter. Slope

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in a figure only depends on the author's choice of units of measurement of quantity and price. If, as in Fig. II, we have a regularly falling demand curve DD' , and either a regularly falling cost curve C_1C_1' (average costs,¹ not marginal costs) or a regularly rising cost curve C_2C_2' , we will in both cases have an optimum production for the monopoly, which is half the quantity at I , the point of intersection between

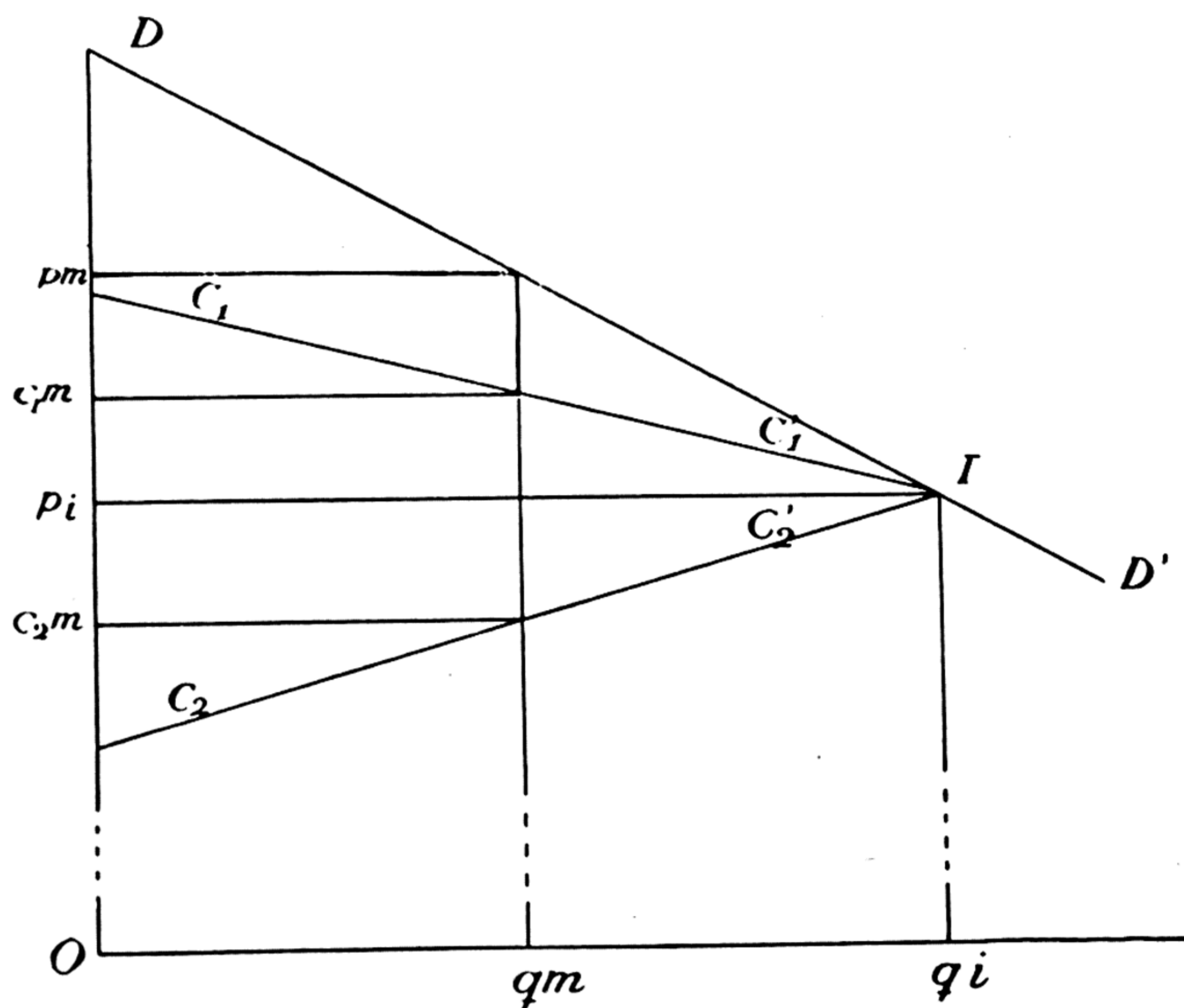


FIG. II

the demand curve and the cost curves. These have been placed so that they intersect each other and the demand curve at the same point. (This will easily be seen when we consider the maximum for $(p_m - p_i)q_m + (p_i - c_{2m})q_m$ or $(p_m - p_i)q_m - (c_{1m} - p_i)q_m$, which will be found at the same quantity sold as the maximum for every single one of these mutually proportionate rectangles, i.e., at a quantity $q_m = \frac{1}{2}q_i$.)

¹ Costs in the long run; the position of overhead costs in case of unused capacity is more complicated.

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Here, as elsewhere in this treatise, we reckon with average costs as determining the price of a monopolist who does not employ price differentiation. If a comparison is to be made with the state of free competition, the rising curve for the average costs C_2C_2' must be substituted by a line from C_2 indicating the marginal costs and with double the gradient. Consequently, in this case the monopoly does not halve the quantity sold, and part of the estimated monopoly profit would under free competition have been earned by competitors with lower costs of production. So long as there is a declining demand curve, the price will still be greatest under monopoly.

In reality, demand and supply curves are rarely straight lines. The demand curve especially, will, as a rule, have a decreasing gradient, since a reduction of the price at the same time causes an increase in consumption, makes new uses possible and attracts new circles of buyers. To begin with, we may assume the theoretical instance in which the monopoly profits are equal at all prices above a constant cost curve CC' , in so far as the excess of the price over the constant costs of production multiplied by the quantity supplied will always give the same return, *cf.* the example in Fig. III. The demand curve DD' is here a hyperbola converging towards the y-axis and the cost line CC' . If, however, we shift the demand curve to the right, or what amounts to the same thing, the y-axis to the left, for instance to y_1 , the maximum profit will be obtained at a very high price and for a very small supply, the monopoly profit being partly the constant area cut off by the original y-axis, the cost line CC' and the perpendicular lines from these on the demand curve, and partly a rectangle between y and y_1 ,

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maximum is reached at a large sale, *cf.* C_4C_4' (which, however, will never fall below a price of 0).

These purely theoretical assumptions of straight-line demand curves or of hyperbolæ, are only of interest in so far as they afford a basis for the consideration of more irregular demand curves, *cf.* Fig. IV, in which curve 1 must of necessity have the point of maximum return at the middle, even more so than the straight line, curve 2. The bump in curve 3,

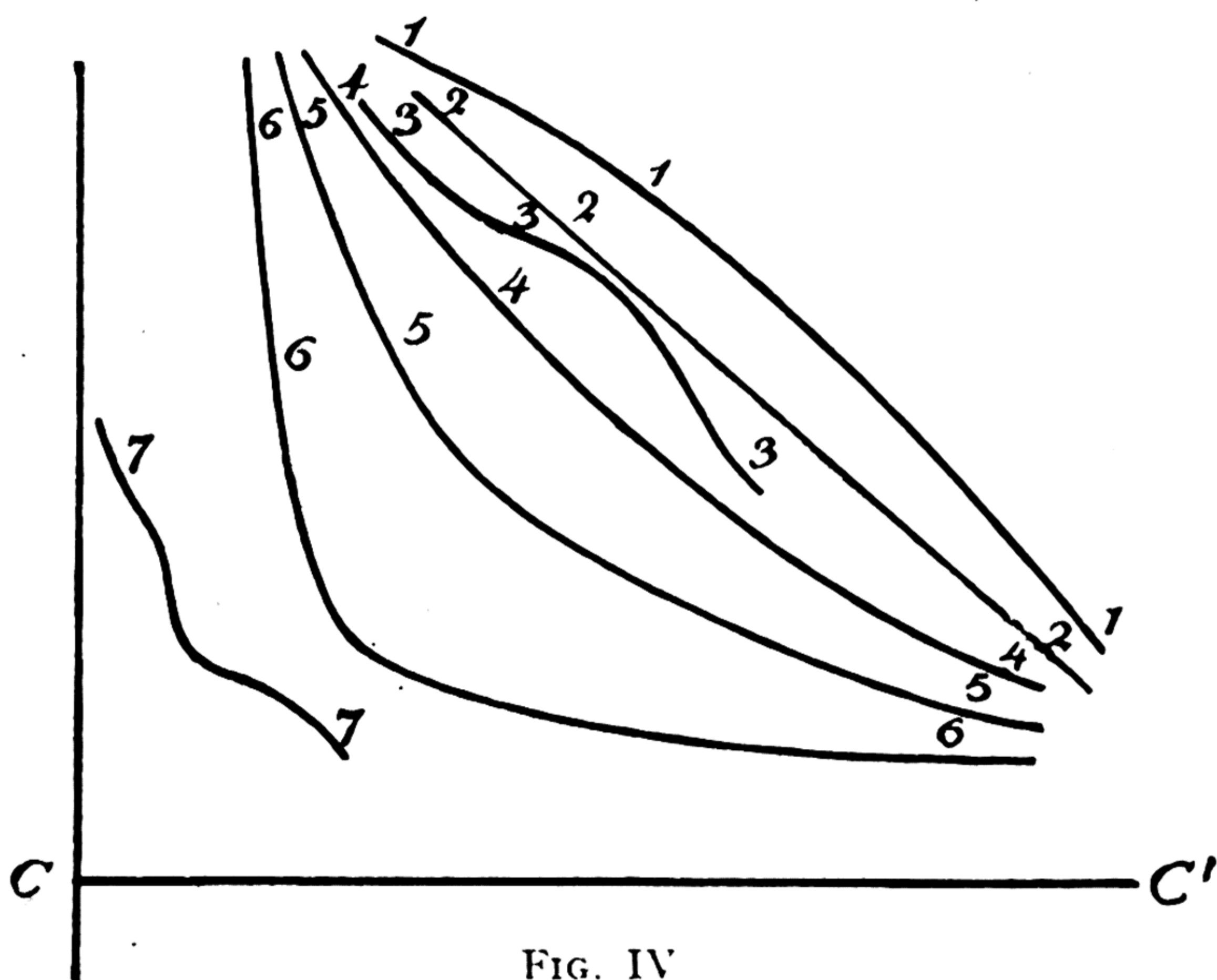


FIG. IV

which may be due to the appearance of a fresh class of consumers, will have a stimulative effect on the monopolist, whereas the depression in curve 7 causes him to seek a higher or lower price. Similarly, a demand curve 6 which is more curved than No. 5, a hyperbola converging towards the axes, gives him the task of choosing between a very high price or a very large production. Curve 4 (which is to be found between the straight line and the hyperbola) has its maximum at the middle, but the force attracting it in that direction

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is weak. We may also consult Fig. VI below, and examine the effects of the shape of the demand curves by considering them as composed of strips of straight lines sloping down from the y-axis to the constant cost line CC' , and having their maxima at the middle or as near as possible thereto.

If the costs are not constant, as for instance in the presumably rather common shape of the demand and cost curves in Fig. V A, the point is to get the maximum for the

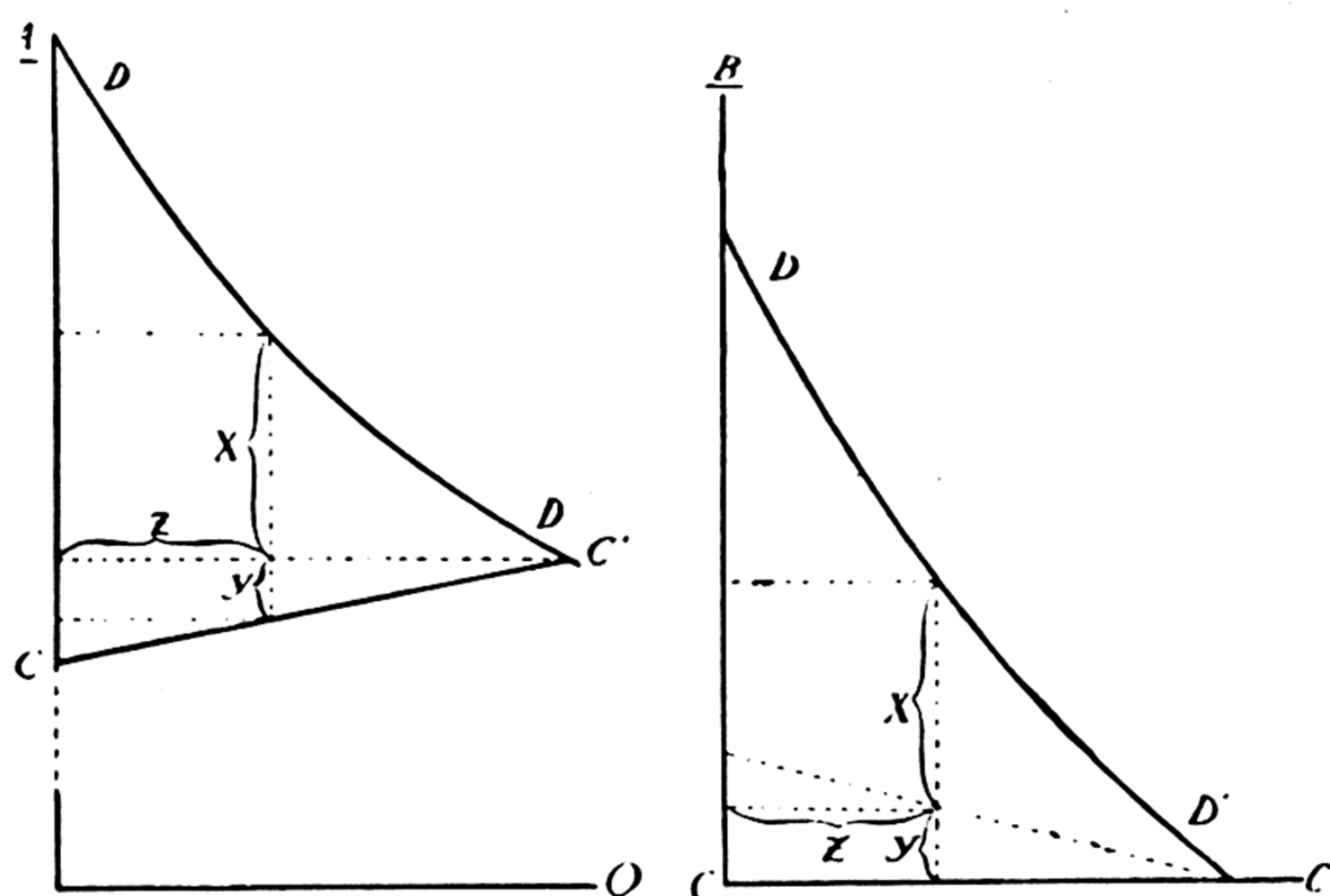


FIG. V

product $(x+y)z$. If, now, we take CC' for the x-axis as in Fig. V B, and consider the excess price corresponding to each quantity, the height of the curve will be $x+y$, and the task will be as simple as in Fig. IV. If the costs are decreasing, we shall have to operate with $x-y$ instead of $x+y$, and consequently have an excess-price curve which slopes less than the demand curve.¹

¹ Gaston Leduc, *Pris de Monopole* (1927), Figures 6-8 show illustrations of the determination of prices with increasing, constant and decreasing costs respectively, by the means of curves indicating the proportion between excess price and quantity, and a number of hyperbolæ, converging towards the axes, cf. Marshall, *Principles*, 8th edit., Fig. 34, page 480.

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Actually, we do not know the whole of the demand or cost schedule, and we only know or suspect what prices and costs will be at definite quantities. Which of the known prices and quantities that gives the greatest profit, can then be determined by a simple calculation. Such a comparison

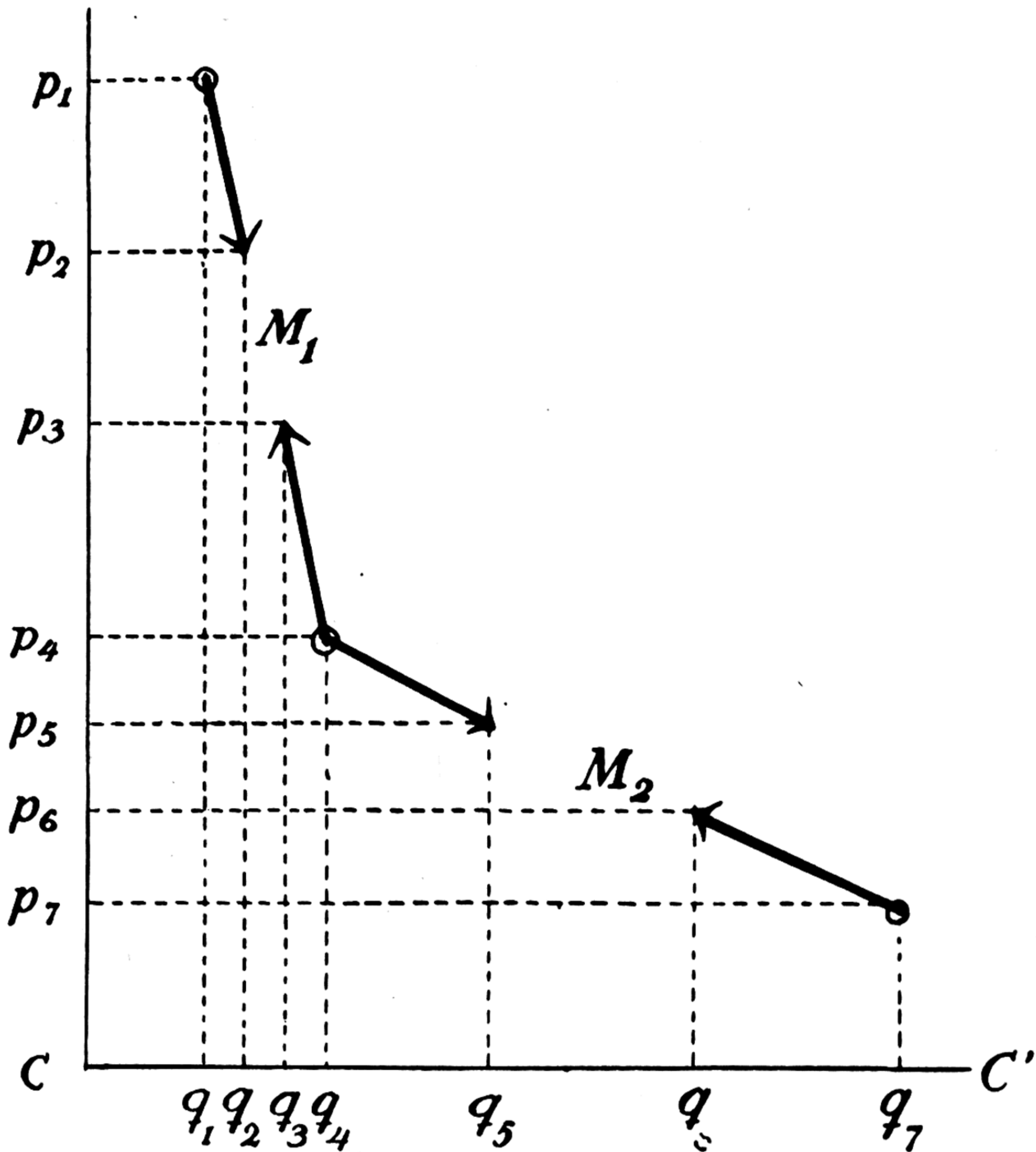


FIG. VI

between two possibilities graphically corresponds to an examination of which of two points on the demand curve (or the excess price curve) that is nearer to the middle of the line joining the two points, reckoned from axis to axis. A lowering of the price from p_1 to p_2 in Fig. VI, will give the

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entrepreneur a profit and a prospect of still more with further reductions of the price. An increase in the price from p_4 to p_3 will also give him a profit, and consequently, it will be expedient for the entrepreneur to ascertain what is the greatest profit that can be obtained between p_2 and p_3 . It would also be profitable for him to reduce his price from p_4 to p_5 . The empirically found, preliminary maximum between p_2 and p_3 , therefore, need not be the final maximum ; the profit here must be compared with that at the other maximum between p_5 and p_6 . The cost curve may also have an irregular shape, as, when production is extended beyond a certain limit, the entrepreneur changes suddenly to new methods, which may be cheaper or more expensive.

Hitherto, in order to simplify matters, we have considered the maximum profit of the monopolist under static conditions ; but in most monopolistic trades circumstances are anything but static, technique and consumption not being fixed. A lower price, too, will create a greater future demand. The higher the price, the greater the probability that the monopoly will be of short duration, since competitors will tend to appear, and public intervention will be possible. If, later on, competition necessitates cheaper production on a larger scale, it will be more profitable, not to set the price with a view to immediate profit, but to try to become the first purveyor of the article in the new market. What the entrepreneur does, depends upon the time elapsing before the reduction of the price is made. Nevertheless, there may be cases in which the profit of utilising the momentary opportunity of high returns more than outweighs the future disadvantage of maintaining a high price at the present moment.

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From the static monopoly calculus one may pass over to the dynamic one by estimating the expectation of profit on a series of future occasions. This entails ascertaining the maximum of the excess price \times the quantity \times the duration, which graphically means the cubic content of a column made up by the monopoly profits of the subsequent years or months, instead of the maximum areas of the rectangles in the above figures. In this, we must, of course, pay due regard to interest and reductions due to uncertainty. Generally, one cannot reckon with fixed prices and quantities in the future, but rather with the expectation of the favourable or unfavourable effects of one's own reactions towards otherwise unknown circumstances. It is, therefore, evident that the correct monopoly policy depends upon a difficult estimation.

3. LIMITED MONOPOLY, PARTIAL MONOPOLY

The monopolist's power to raise his price is always *limited* by demand and costs. A maximum price maintained by the State is graphically the same as cutting off the top of the demand curve with a straight line. A monopoly will always be exposed to competition from substitutes. The same want may generally be satisfied in several different ways, and when a certain minimum of satisfaction has been obtained, different wants will compete with each other for the buying power of the consumers. Thus the price conditions of one commodity influence the demand for another, and if there is only a slight difference of quality between the two, the result will be much the same as when there is competition between two firms selling the same thing. If a

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certain commodity is produced in a market in which the price is set by competition between many enterprises, a similar commodity that is monopolised, will have a maximum price determined by the price of the former commodity with an addition or deduction covering the difference in quality between the two (the individual buyers' valuation of this difference). The monopoly policy is here restricted to the above addition or deduction for the difference in quality, which in individual cases may afford a greater or a smaller margin according to the income level of the class of buyers. It may, for instance, be a question of the buyers' predilection for a much advertised manufacture which perhaps is in no way better than or different from a number of other commodities. If the competing commodity can only be produced in increasing quantities by increasing the costs, it may still be advantageous for the monopolist to allow the quantity to increase to a certain extent, whereby also the price will be raised. This instance is an example of a monopoly price having influence upon a competitive price.

Competition or a possible competition with more distant places, has the same effect as competition between enterprises with different methods of production, since transportation may be included as a special element of cost to an unequal extent. When the monopolist sets his price with a view to what will pay in the long run, the latent competition, which arises if the trade becomes too attractive, has the same effect as actual competition. Where the monopolist has the means of fighting fresh competitors, he will not be afraid of taking a profit that corresponds to the risks and costs of intrusion.

Where one's competitors sell a different quality, one is

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still formally in possession of an absolute monopoly, even if in reality, conditions are highly characterised by competition ; when competition comes from a great distance, one has an absolute local monopoly. If there is competition with regard to the same quality in the same place, the absolute monopoly no longer exists, but there may still be a *partial monopoly*, which is possibly stronger than many formal absolute monopolies. A partial monopoly exists when one enterprise has so much power in the market that it is to its interest to charge a price which exceeds costs, even if sales are reduced thereby, whilst at the same time there are other enterprises which at each price have certain different sales irrespective of the policy of other firms, the monopoly included. This is often the case where by the side of one very large enterprise there are many smaller ones, which for a long time will be unable to extend their production, and perhaps will not be allowed to do so by the larger concern. In practice it is often reckoned that an enterprise or a combination of enterprises can control the market if they have 70-90 per cent. of the sales. Where the demand is inelastic, and extensions can only be very slow, far less may suffice. In reality there is no fixed limit.¹ Limited competition may furthermore be due to public concessions. Irrespective of how often the conditions of partial monopoly exist, we shall here take the case in its pure form as an introduction to the following, more complicated instance of competing monopoly. We shall not in this place deal with the very important group of cases, in which the partial character of the monopoly is not due to the fact that there are other enterprises outside,

¹ Besides the ordinary trust literature, see Karl Forchheimer, "Theoretisches zum unvollständigen Monopole," in *Schmollers Jahrbuch* 1908, which article also contains illustrative numerical examples.

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but to a limitation in the co-operation of the enterprises. If, for instance, there is agreement only with regard to the fixing of prices, but no restriction of competition in the quality of the commodity offered, nor in the charges for delivery, there is actually occasion to charge different prices for services equally demanded.

In Fig. VII we begin by assuming a straight demand curve

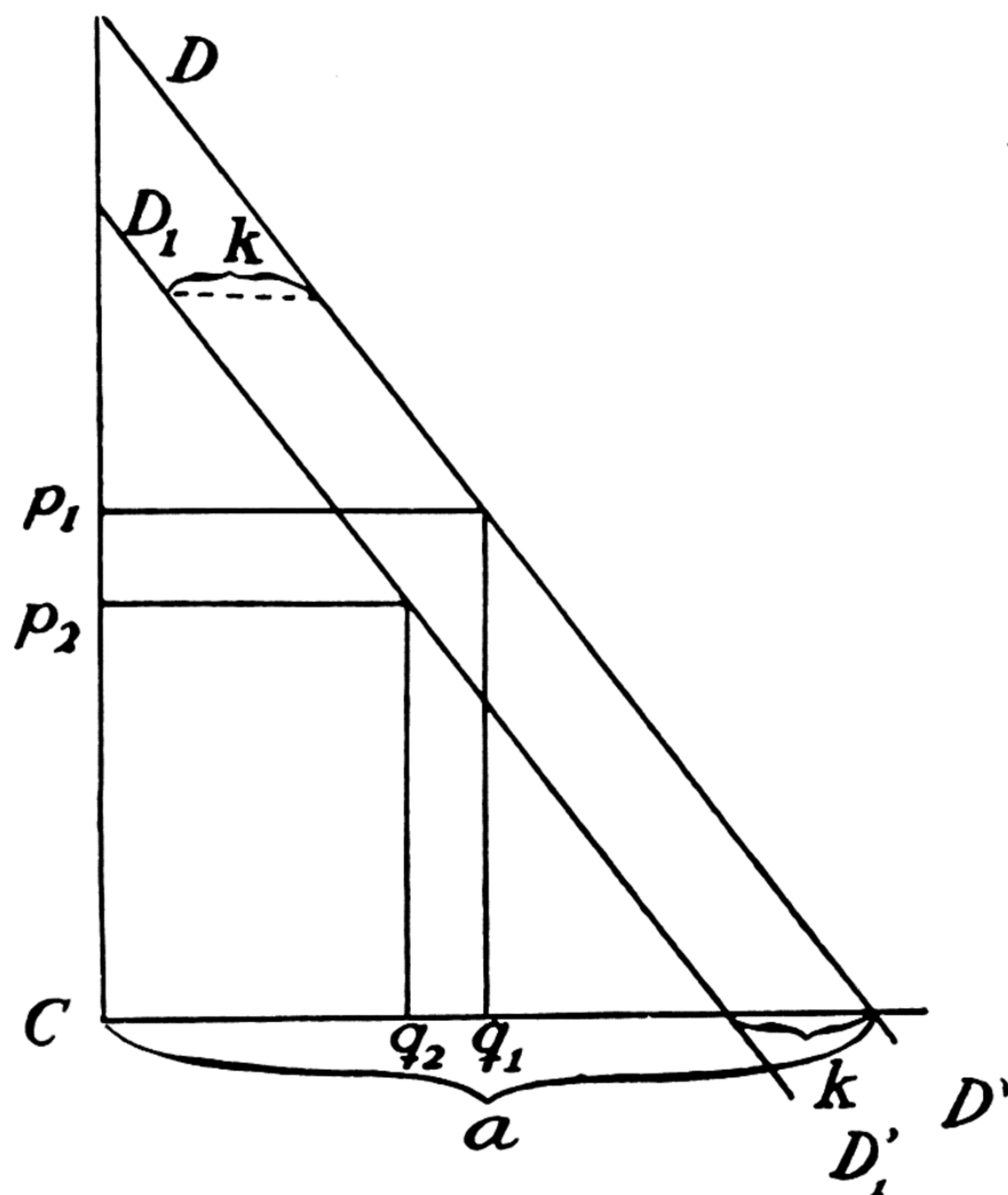


FIG. VII

DD', and constant costs CC' common to the monopolist and to his competitors, and moreover, that the sales of the latter are constant, irrespective of price. In the simplified instance which the figure covers, the monopolist, if he were alone, would set a price p_1 , which would give a sale, q_1 , of $a : 2$. If now, his competitors take an amount k of his sales, the demand curve DD' from the point of view of the monopolist

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will be substituted by a curve $D_1D'_1$ parallel with the former ($D_1D'_1=DD'-k$) ; and the monopolist will set his sale at $q_2=(a-k):2$, i.e., the monopolist will limit his sales by half of what his competitors have taken, and consequently, the total sales by the intervention of the competitors will be increased by a half.

The conclusion we make from this simplified case must not be too general. The monopoly policy is apparently capricious, but actually it is only complicated. Greater competition may cause the monopolist to decrease or increase his sales, and raise or lower his price according to circumstances ; the only certainty apparent is that the total sales will be increased. Fig. VIII A—E illustrates the effect of a competitive supply of varying size, but independent of price. The line m , from the demand curve to the y -axis, indicates the combination of price and quantity which the monopolist will choose according as the supplies of his competitors increase—i.e., the monopolist's line of retreat from the absolute monopoly. (In the more complex Fig. E the monopolist's line of retreat has been constructed by shifting to the left a figure of the same form as the hatched area to the right of the demand curve, and finding by a rough estimate the point now affording the greatest area for the monopoly profit.) If the costs (average costs) as in Fig. B, are increasing—and are diminished as a result of restricting sales—the competitor will force down the price more than under constant costs. If the costs as in Fig. D—contrary to Fig. C—are falling more than half as rapidly as the demand, the competition will involve a *higher* price. It is hardly probable, however, that this case will occur very often, *cf.* page 58. In Fig. VIII E, which presumably, will not fall far short of

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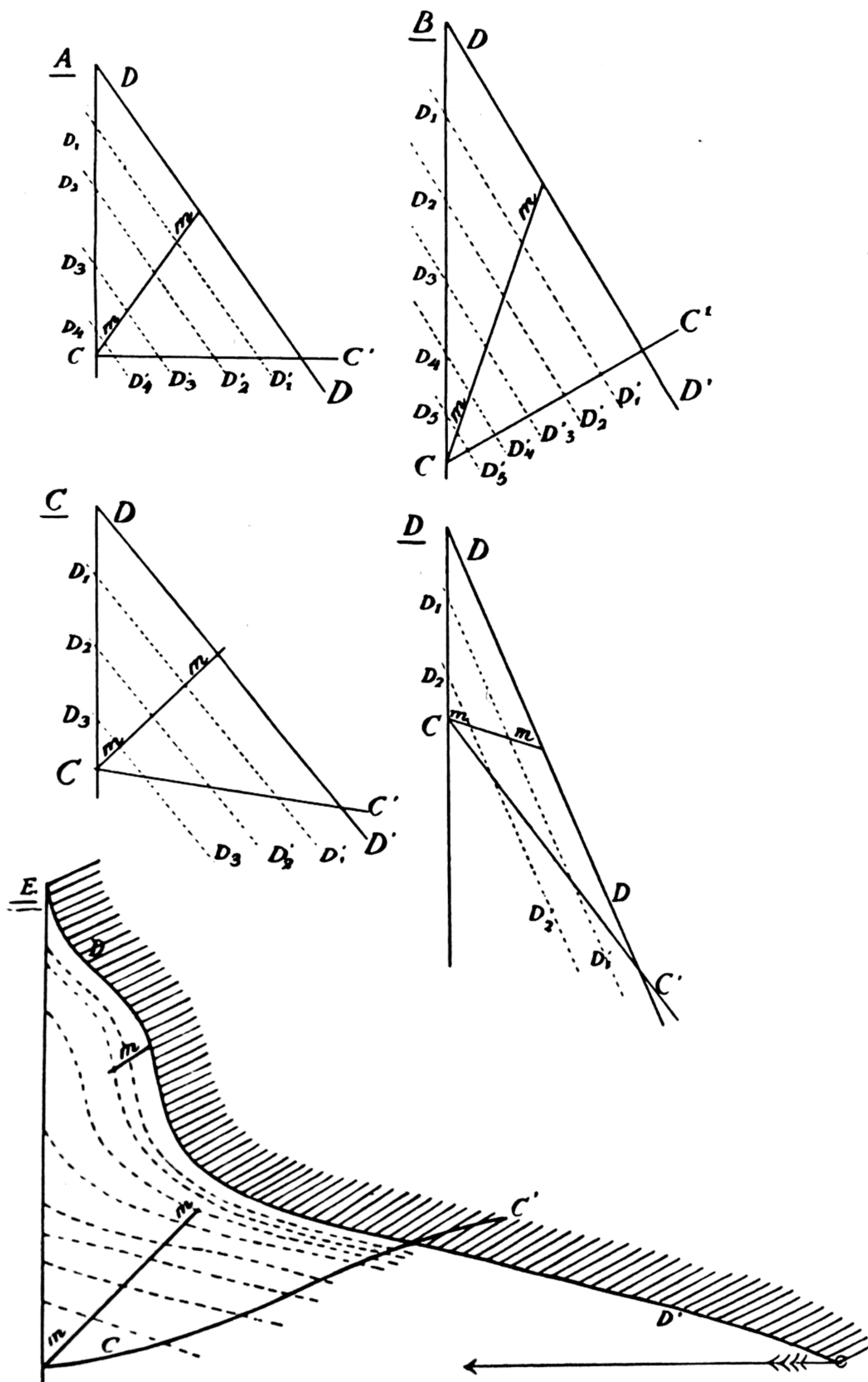


FIG. VIII

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many real cases, the monopolist will suddenly extend his sales at a certain point, when a small amount of competition is spoiling a high price policy ; but if the competition should be further extended, the monopolist will once more find it to his interest to restrict his sales.

That competition may really make a monopolist extend his sales permanently and not only as a temporary fighting measure, will be evident from the extreme case in Fig. IX,

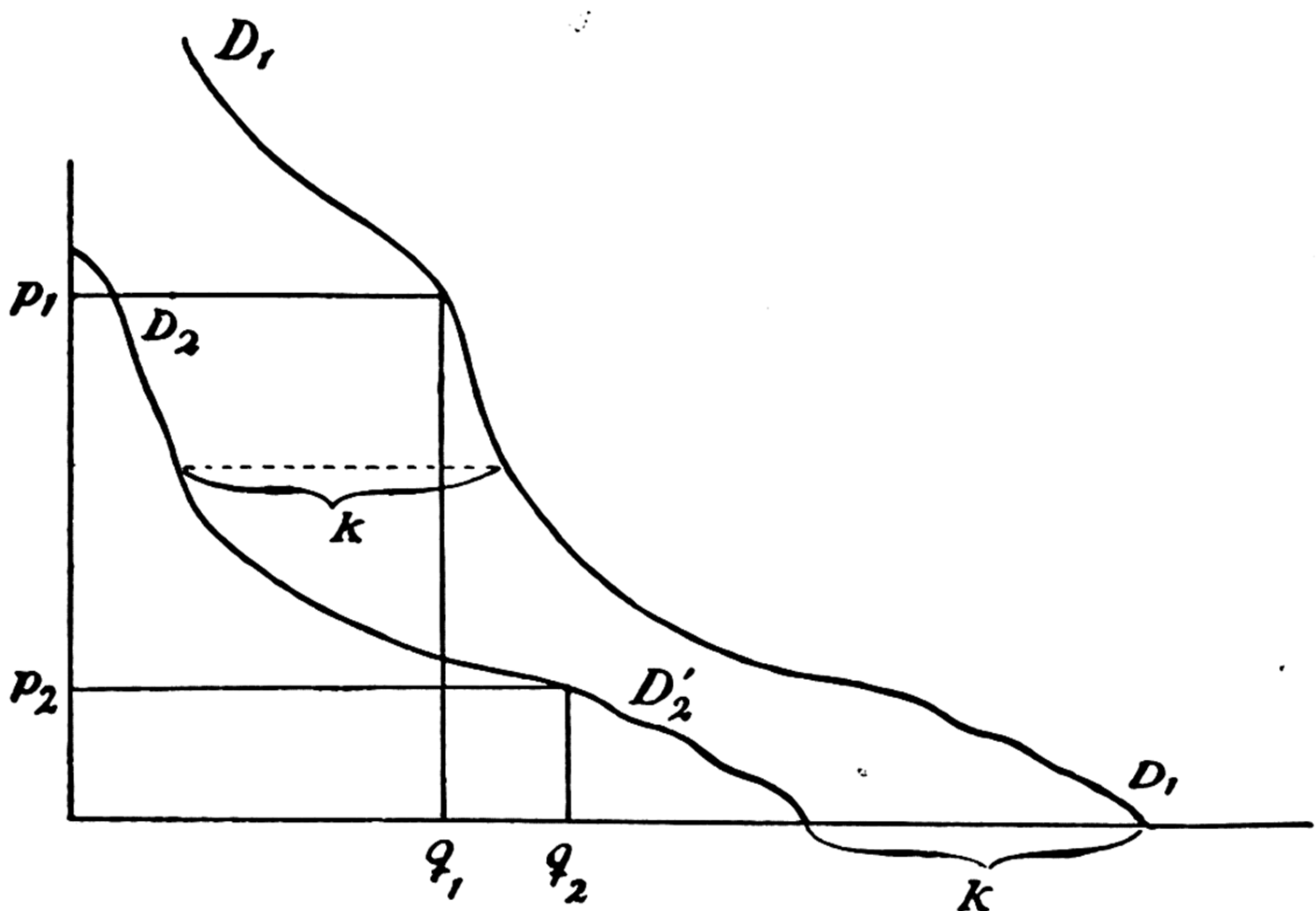


FIG. IX

where the most profitable sales, $D_1D'_1$ being the demand curve, will be at the high price p_1 and the small quantity q_1 ; but if the competitors produce the quantity k , thereby reducing the demand curve of the now "partial" monopolist to $D_2D'_2 = (D_1D'_1 - k)$, the low price p_2 together with the great quantity q_2 will be most advantageous, since the profit at the high monopoly point is most reduced as a result of the competition. (The increased supply of the monopolist

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as a result of competition may also be illustrated by shifting the hyperbola shaped demand curve in Fig. III to the left, or correspondingly, shifting the y-axis to the right to y_2 .)

Hitherto, we have assumed that the competitors produced a constant supply, at any rate when they reached above a certain common supply price. Usually, however, the extent of their supplies increases with the price. In Fig. X we see how price and quantity are determined when the competitors of the partial monopolist have a certain supply curve. In Fig. X A we have assumed the demand and supply curves of

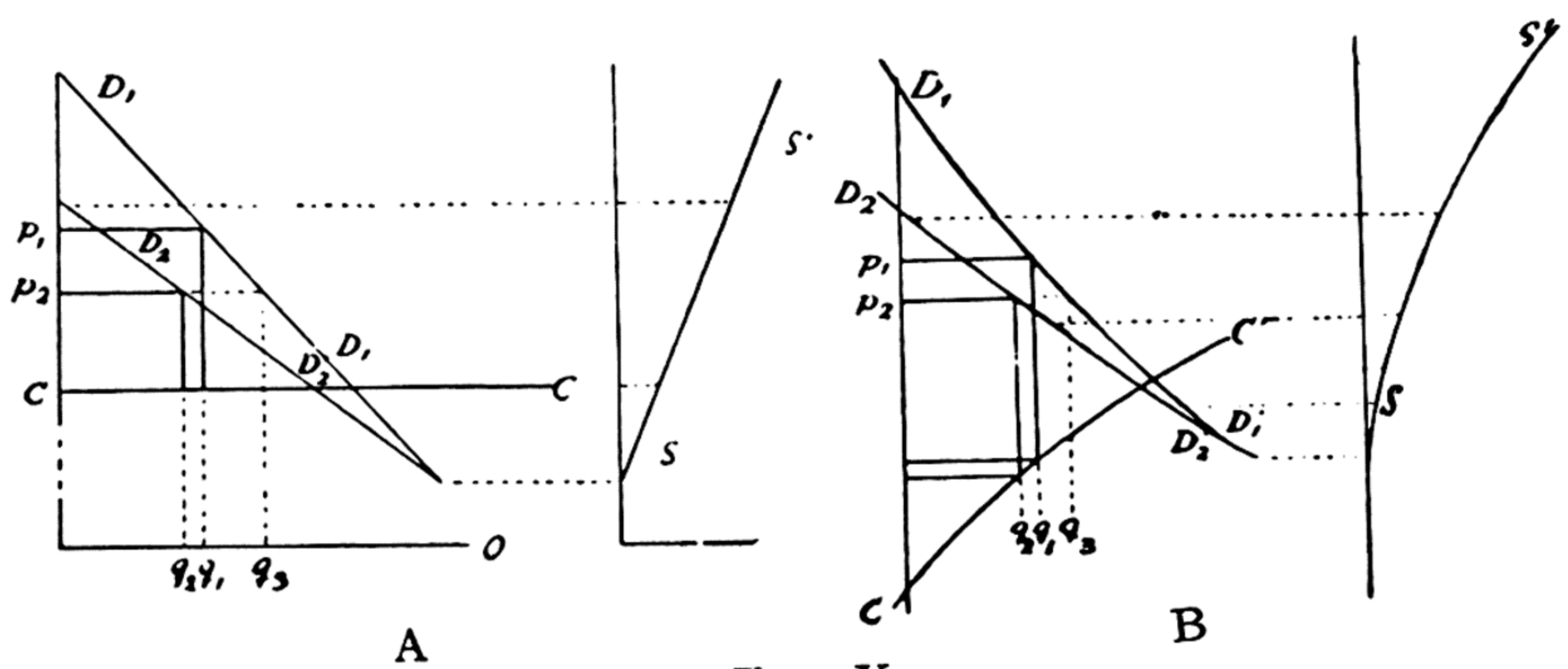


FIG. X

the competitors to be straight lines and the costs of the monopolist to be constant, whilst in Fig. X B these more specific assumptions have been abandoned. To the right of the figures the supply curve SS' of the competitors has been plotted from a special y-axis. The distance of the curve from this axis indicates the total supply of the competitors at the different prices (their marginal costs). Next, in Fig. X A and B to the left, we have constructed the demand curve $D_2D'_2$ such as it appears to the monopolist, by deducting at each price the supply of the competitors from the actual demand curve $D_1D'_1$, which is common to all the producers.

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Thus, in the case of the partial monopoly, we have a definite solution just as in that of absolute monopoly ; whereas price and quantity without competition will be p_1 and q_1 , the result here will be a price of p_2 , a quantity for the monopolist of q_2 , and a total quantity of q_3 .

CHAPTER II

MONOPOLISTIC COMPETITION

I. COURNOT'S SOLUTION AND ITS UNDERLYING ASSUMPTIONS

PARTIAL monopoly, where only one entrepreneur tries to obtain the greatest possible advantage both in the fixing of price and of quantity, whilst the others do not employ a price policy but have to suit their sales to the price, is comparatively simple. The case of "*monopolistic competition*," i.e., the instance in which several entrepreneurs have at the same time so great a share in the production that they may be, and are, interested in influencing the price even at the cost of some reduction of their own sales, is more complex. The actions of one entrepreneur will be adjusted to those of the others, and vice versa. Many economists, therefore, think that no stable equilibrium can be obtained in this instance, but others are of the opposite opinion. The different points of view depend, however, on the choice of hypotheses. If this is realised, it will be understood that it is not true that one solution is correct and the others are wrong, but that the different theoretical instances become more or less exact illustrations of more or less probable instances from real life. The precarious point, towards the solution of which contributions from many economists are needed, is the valuation of the assumptions:—the extent

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to which the possibilities mentioned below are applicable, or to which other more complex assumptions must be made, and whether a solution is then possible. The corresponding discussion of the somewhat analogous question of "bilateral monopoly", a monopolistic buyer opposed by a monopolistic seller, will be dealt with in a succeeding chapter.

In this and the following instances, as elsewhere in this volume, when the opposite circumstance is not emphasised, we assume that the individual entrepreneurs are not bound by any agreement or expectation that a sacrifice on their part for the benefit of the other enterprises will be returned. If now, like Edgeworth¹ and a number of other authors, we assume the highest degree of mobility, so that only a slight reduction of price by one competitor will immediately

¹ A consistent application of the apparently unrealistic assumption of absolutely free competition between the enterprises, may be found in Bertrand's criticism of Cournot in *Bulletin des Sciences mathématiques*, 1883. He writes on page 298 above: ". . . quel que soit en effet le pris commun adopté, si l'un des concurrents abaisse seul le sien, il attire à lui, en négligeant des exceptions sans importance, la totalité de la vente, et il doublera sa récolte si son concurrent le laisse faire. Si les formules de Cournot masquent ce résultat évident, c'est que, par une singulière inadvertance il y introduit, sous le nom de D et D', les quantités vendues par les deux concurrents, et que, les traitant comme des variables indépendantes, il suppose que, l'une venant à changer par la volonté de l'un des propriétaires, l'autre pourra rester constante. Le contraire est de toute évidence." The criticism is especially carried into great detail by Edgeworth who, moreover, employs an example with limited capacity, which sets a special minimum to the price, see "Papers Relating to Political Economy," Vol. I, Sect. II, E IV (reprint and translation of an article in the *Giornale degli Economisti*, 1897), particularly the example on page 118ff. and the popular résumé on page 135ff., cf. the review in the *Economic Journal*, 1922, page 400ff. Among those who have walked in Edgeworth's footsteps are Pareto (§ 145 in *Cours d'Economie Politique*, 1896), Pigou, who in *The Economics of Welfare*, II, XV § 2, comes to the conclusion that price and sales remain indeterminate within a certain sphere, Irving Fisher, who in his article "Cournot and Mathematical Economics" in the *Quarterly Journal of Economics*, 1898, pages 126-7 emphasises the dynamic factors as the decisive ones; H. L. Moore, in the same Journal (1906), gives an exposition of Edgeworth's arguments, mainly in popular form (a representation endorsed by Marshall in *Principles*, 8th edit., page 494 below); Leduc, page 257ff.

give him all the sales in so far as his capacity allows it, it is quite right that there is no position of equilibrium, at any rate not at a price above costs. It is to the interest of each competitor to underbid the others so long as there is any monopoly profit. If it disappears completely so that nothing is obtained above costs, one enterprise may possibly again be allowed to raise the price, after which the others will follow suit, and a new race downwards set in. Consequently, with a complete realisation of the assumptions of free competition as regards mobility and the capability of the individual to take care of his own interests, a position of equilibrium cannot exist at a price above cost, even though the number of competitors is strictly limited.

The position of equilibrium which Cournot was the first to discover, the idea of which has been endorsed and further explained by Wicksell, and which I have dealt with in my book, *Den økonomiske Fordeling*¹, is brought about in such a way that the price and quantity sold are found for each enterprise when the quantity of the other party is given. As Wicksell puts it: "You find a postulated position of equilibrium, in which each of the parties seek the maximum

¹ See Augustin Cournot, *Recherches sur les principes mathématiques de la théorie des richesses*, 1838, cf. the English edition (1897 and 1927) with comments by Irving Fisher. In the beginning of Chapter VII of this book, the author has solved the problem of finding the sales, which give one enterprise the greatest possible monopoly profit, when it is assumed (1) that both enterprises are to have the same price; (2) that the sales of the other enterprise are considered as previously given. Wicksell follows Cournot's solution in *Archiv für Sozialwissenschaft und Sozialpolitik*, 1927, see page 267ff., particularly page 269, the third paragraph; in an introduction to this article, Schumpeter also endorses the same points of view, cf. page 369 of his article in the *Economic Journal*, 1928. E. H. Chamberlin has in the article, "Duopoly: Value where Sellers are few," *Quarterly Journal of Economics*, Nov., 1929, given a survey of the existing theories. He thinks that there are different solutions under different assumptions. J. Tinbergen: *Bestimmung und Deutung von Angebotskurven*, *Zeitschrift für Nationalökonomie*, 1930, contains a statistical example, which is in fairly good accordance with Cournot.

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profit under the assumption that the other party does not alter the amount of his supply." This means, in other words, that the individual entrepreneur adjusts his price to changes in the total demand which may have been brought about by changes in his own price.

We shall first, in a simplified, graphical form, illustrate Cournot's solution without discussing its correctness. As in Fig. XI, the case may be illustrated by temporarily reckoning with a fixed sale e for one monopolist and by

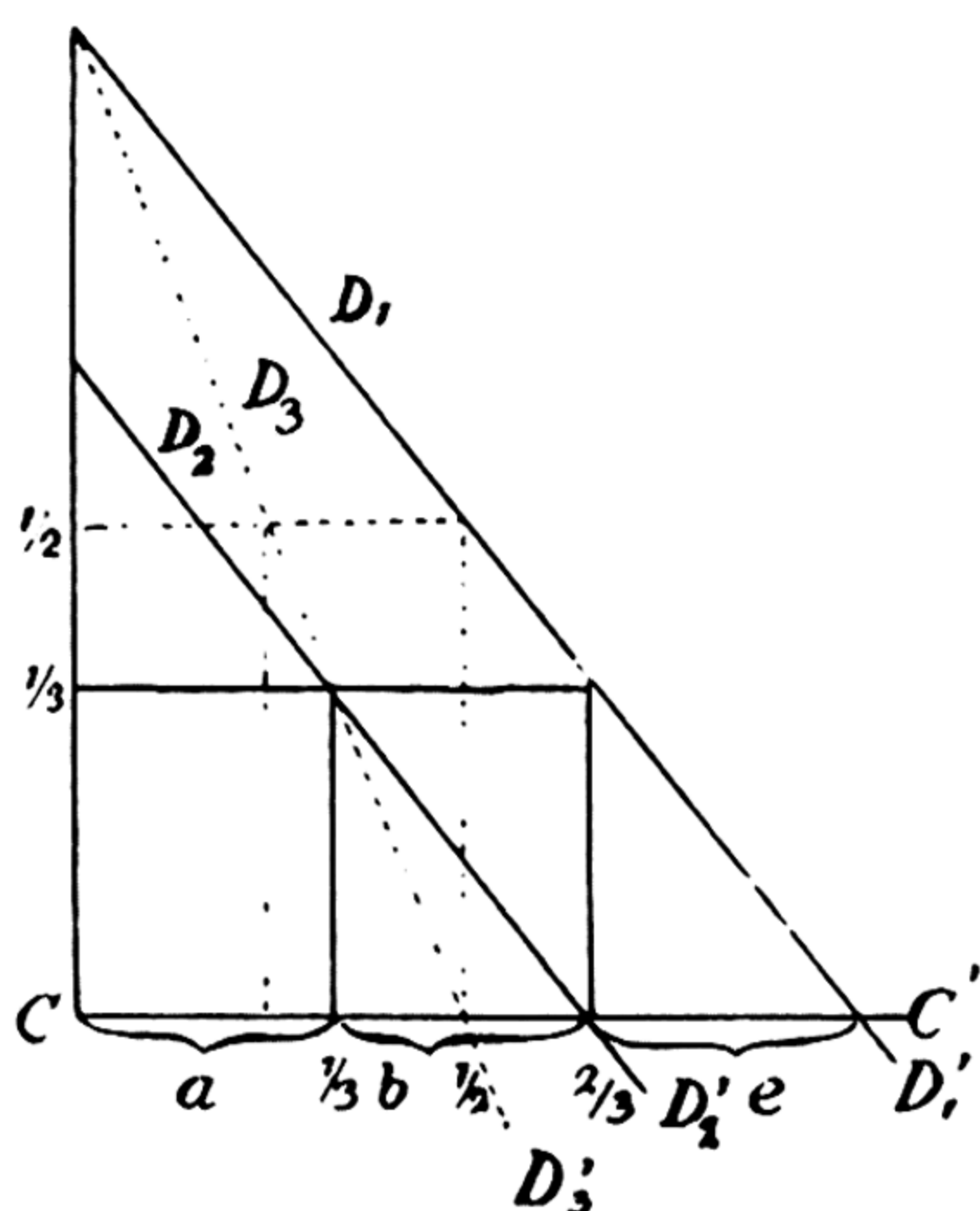


FIG. XI

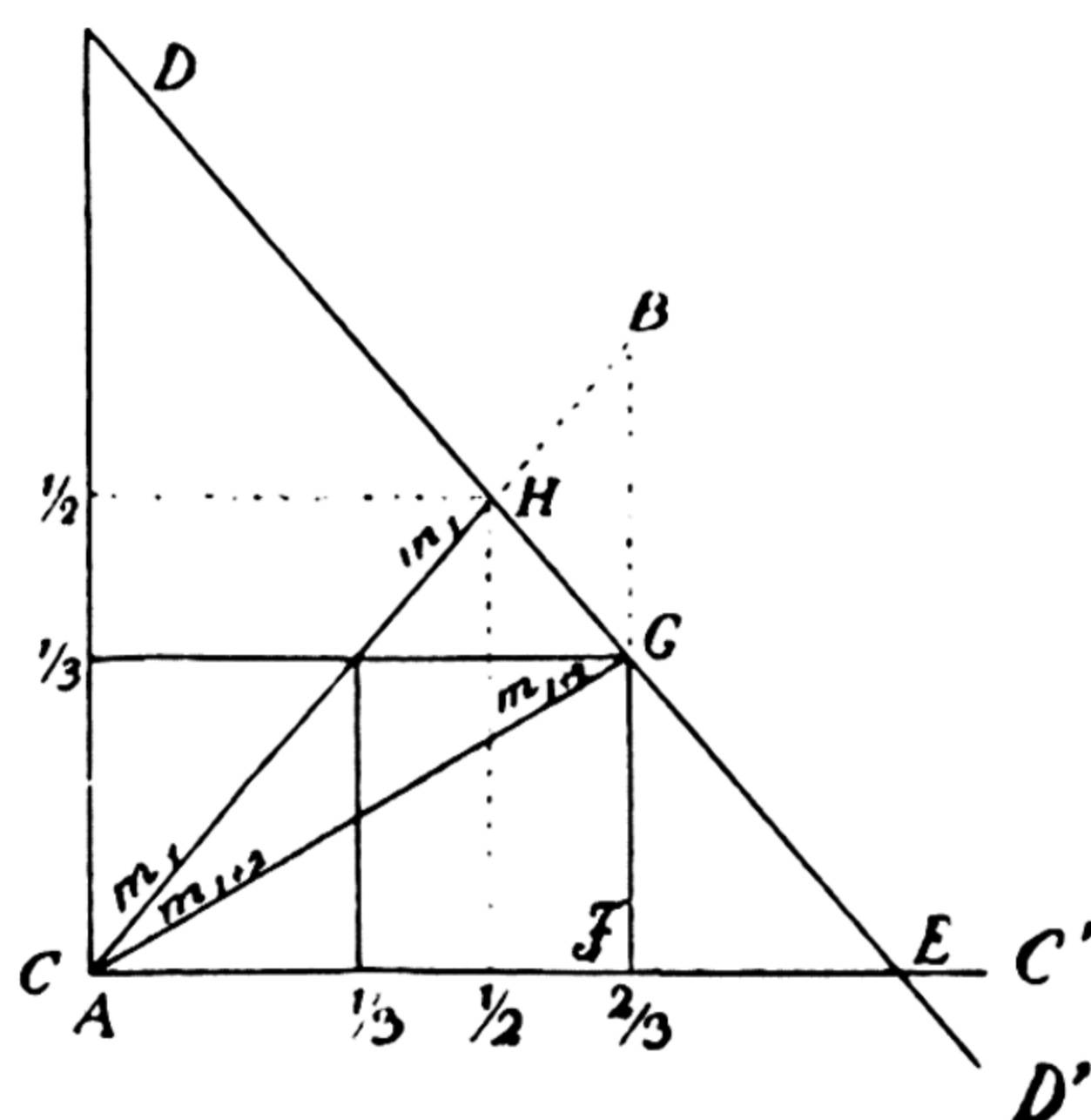


FIG. XII

finding the monopoly point of the other, the price and sale of either monopolist being equal at the same time. The common demand $D_1D'_1$ has been substituted by $D_2D'_2$ for the second monopolist, the sale of the first having been deducted. In the limited market, equilibrium is attained with a demand of $D_2D'_2$ when $a=b$. As the first enterprise is in a similar situation, we get $a=b=e$, i.e., the total sales are $\frac{2}{3}$ and the price $\frac{1}{3}$. In Fig. XII another method has been employed; here a monopolist, if the supply is gradually restricted, will find it profitable to reduce price and

production, and on his retreat he will follow the line m_1m_1 , cf. above page 19. If there were two entrepreneurs on the market, either of them would be in the above predicament. As in order to obtain equilibrium they must have the same price, their total supply at different prices must follow the line m_{1+2} with double the sales of m_1 . The point of intersection between m_{1+2} and the demand curve DD' is situated so that the price in the case in question, just as in Fig. XI, will be $\frac{1}{3}$, the total sales $\frac{2}{3}$ and the sales of each of the competing monopolists $\frac{1}{3}$. ($\triangle ABF$ and $\triangle EGF$ are similar, and $BF=2GF$.) The dotted lines to H indicate price and sale if there had only been one undertaking.

The first of the figures, Fig. XI, may at the same time illustrate the way in which a certain alteration of the assumptions modifies the result. If the individual monopolist does not take his own measures under the assumption of a definite production for the other party at each moment, but if he himself always reckons with having half the sale, i.e., in the way that the reduced demand curve $D_2D'_2$ is substituted by $D_3D'_3$ (half the total demand), the price will be $\frac{1}{2}$ and the sale $\frac{1}{4}$ for either monopolist. They obtain the maximum profit by thus sharing equally the profit of the individual monopolist. But this presupposes that they can always be sure of each getting half the sale, i.e., that they are bound together tacitly or expressly, so that either of them can resist the temptation of a small extension of his production which takes nothing from the other party, perhaps not even being noticed by him since it is taken from the unsatisfied part of the demand, but if continued would nevertheless gradually make it impossible for him to maintain both the present price and production.

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The characteristic feature of Cournot's solution is really, that if it is to be correct, it must be based on the assumption that a price reduction on the part of one monopolist will attract the unsatisfied wants more easily and quickly than it would attract the customers of his competitor. Equilibrium is achieved in such a way that each individual seller takes the monopoly price corresponding to a demand that covers his own actual sales, together with the total unsatisfied demand of the market common to all sellers. When, in the following, we speak about Cournot's assumptions, we mean those which, according to the above, must be present in order that his solution can be correct in the given case.

The policy that will be followed under these assumptions is illustrated in Fig. XIII by deducting the equally large sales of the other entrepreneur from the demand. A very high price is untenable in Fig. XIII, 1, since the unsatisfied demand b is greater than the sales, a , of one monopolist. Neither is the price of $\frac{1}{2}$, the most profitable for one monopolist or combination, tenable in this instance (Fig. XIII, 2) ; on the other hand, equilibrium is established at a lower point where the sale of each monopolist under the preliminary assumption of a straight line demand curve is equal to the total unsatisfied consumption (Fig. XIII, 3 ; equilibrium the same as in Figs. XI and XII). Neither is a lower price tenable, see Fig. XIII, 4. With the given conditions of constant costs and the assumption of a uniform market the competing enterprises are bound to obtain the same sale (equilibrium not being established in Fig. XIII, 5 until $a=e$ and $b=e$, i.e., $a=b$). The greater the number of competitors, the lower and nearer to costs will be the price

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(Fig. XIII, 6). In other words, the monopoly will gradually be transformed into competition as more and more enterprises enter the market.

We may suppose that Cournot's assumptions cover the actual conditions, at any rate to a certain extent. Several unsatisfied buyers may be attracted by rebates and small favours without the other producers being aware of any

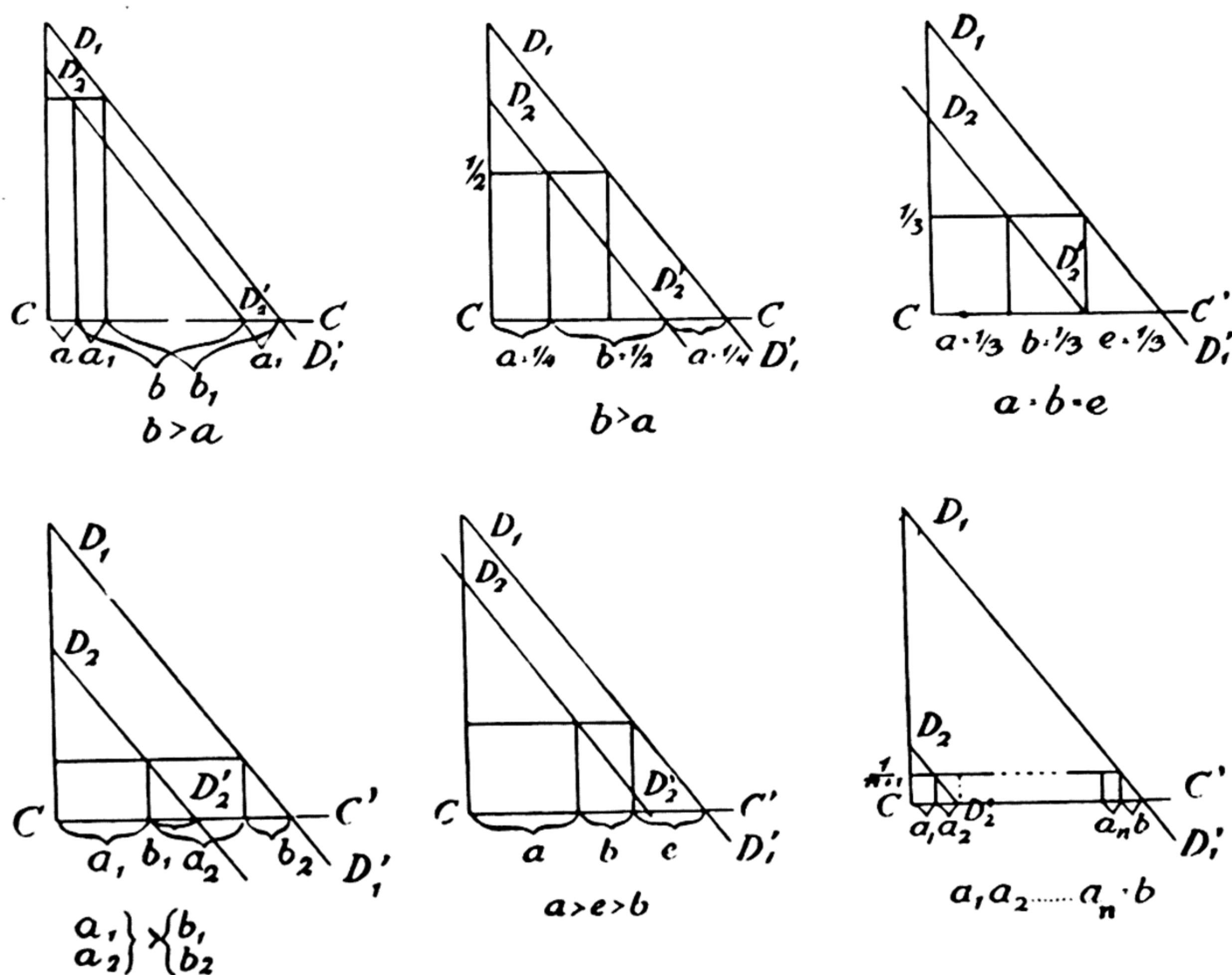


FIG. XIII

inconvenient competition and having to take defensive measures. The individual seller is afraid of mobilising his competitors, and consequently he leaves their customers alone, preferring to cater for new buyers. Possibly a special kind of resistance may have to be overcome in order to attract the customers of another enterprise. In Fig. XIII, 1 and 2 the unsatisfied market, which is great as compared

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with the individual's own production, makes him reduce his price. In Fig. XIII, 3 and 6 there is equilibrium between the sales of the individual entrepreneur and the common unsatisfied market, and no one has a lasting advantage in attacking the sales of their rivals, as the result will very soon be a general fall of prices accompanied by a recapturing of the temporarily lost customers by the other entrepreneurs.

It is certain, however, that this distinction between a common unsatisfied consumption for the whole market reacting to the small price reductions of individual entrepreneurs in full conformity with the common demand curve of the market, and certain parts of the consumption closely connected with the individual sellers, and not reacting at all to the small, very prudent invitations of their competitors, is a considerable simplification of the actual conditions. On one hand, not all sellers have the same access to the whole of the unsatisfied demand, and on the other, extensions may take place, partly at the cost of competitors.

2. CHOICE OF ASSUMPTIONS

Fig. XIV illustrates a number of different assumptions which may be supposed to hold good in markets with a few enterprises not united by agreements or in other ways bound to pay any regard to one another. Under the figures we have stated the specific assumptions and in parentheses the results. In the first ten instances we have reckoned that the assumed extensions of sales, at any rate in the case of small alterations of the price, are proportionate to these alterations. Consequently, in order to establish equilibrium, it

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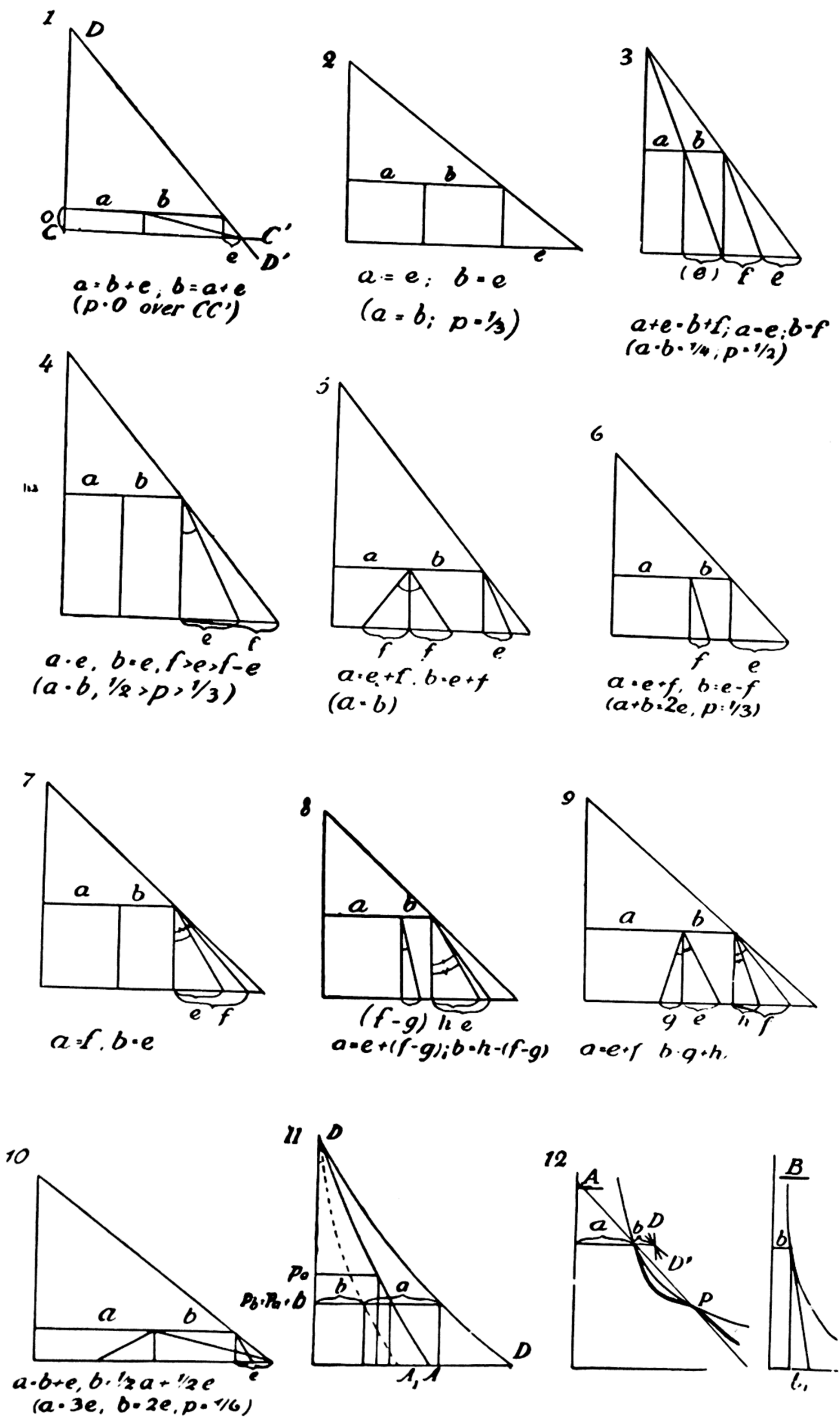


FIG. XIV

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is necessary that the sales of the enterprises should be equal to the extensions caused by a reduction of the price to the costs (in the figure illustrated by the strips of line intersected on the cost line by the produced lines of extension) ; the monopoly point being at the middle, just as on C I in Fig. I. The decisive feature of the deliberations of the individual entrepreneur is, in all cases, the extension of sales that will be the result when *he himself first* reduces the price, and the other entrepreneur has had an opportunity of following suit.

In the first instance with the assumption that a small reduction of price on the part of one entrepreneur will immediately allow him to capture the whole of his rival's sales plus the whole of the fresh consumption corresponding to the price reduction, competition will force the price towards O. When all profits have vanished, and with them the interest of the individuals in the extent of the production, an entrepreneur may perhaps find it to his advantage again to raise the price, if only for a short time. Example No. 2 corresponds to Cournot's assumptions ; in Example No. 3 the market consists of two quite similar, but absolutely separate parts. The price will here be the same as in the case of a single absolute monopoly, *cf.* the dotted lines in Fig. XI.

In Nos. 4, 5 and the following instances, with which we are about to deal on page 43 below, the capability of the individual entrepreneur to extend sales at small price reductions is limited to a part of his rival's customers and to part of the unsatisfied demand respectively ; possibly there may even be differences between the capability of extension of the individual enterprises.

3. HOTELLING'S CASE

Before continuing with these examples it will be useful to examine some views set forth by Sraffa and Hotelling.¹ In my book *Den økonomiske Fordeling*, I have myself taken up similar views. The markets are not uniform, and the individual enterprises have greater or smaller advantages in the way in which they are able to appeal to the customers. Local differences and differences of quality create a number of limited monopolies each in their special sphere and bounded by competition from more remote markets or from substitutes. In each individual part of the market one enterprise will have a limited absolute monopoly or advantage; but gradually, as they try to utilise this advantage, more and more rivals enter the market. According as these advantages tell, either monopoly or competition will prevail. We may, as proposed by Sraffa, consider a given commodity as the sum of a more general competitive commodity and an absolutely monopolised commodity combined by a united demand. The competitive commodity being for instance a hat, plus a monopolised quality stamp. Hotelling emphasised the predilection of individual buyers for individual sellers. If the others reduce their prices a little, the whole of the customers of the undertaker who does not do so will not immediately disappear, as in the absolutely mobile, uniform market, but a gradual defection will take place. How much one entrepreneur sells, is a continual function of the differences between the prices set by all the sellers. The abilities of individual sellers to extend their sales by attracting new

¹ Sraffa, "Laws of Return under Competitive Conditions," *Economic Journal*, 1926; my own book, *Den økonomiske Fordeling*, page 67-71 and page 76; Hotelling, "Stability of Competition," *Economic Journal*, 1929. J. M. Clark: "The Economics of Overhead Costs" contains similar points of view, cf. Edit., 1929, page 417, 435, 441 and 459.

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customers or those of their rivals naturally differ. However, it will not be a single best seller, who determines the equilibrium, but all will contribute their greater or smaller share thereto.

The effect of differences of place and quality has been illustrated in a very interesting theoretical case, which Hotelling has drawn up and solved by means of formulæ ; in Fig. XV this case is illustrated in graphic form. He imagines a transcontinental railway or an American Main Street, and supposes two sellers to be situated at the black squares on the thick line at the bottom of the figure. The number of buyers are supposed to be uniformly distributed along the line, and their demand to be at the extreme of inelasticity, for instance one unit of commodity each, irrespective of price. The sellers are supposed to be unable to charge differential prices or to agree as to a common price policy. *The costs of transportation, assumed to be proportionate with the distance* (and in the figure identified therewith) *are paid by the buyers*, so that we get an increasing series of local prices according as we move away from the business of the seller. How are prices determined, and how will the two sellers divide the market ?

If entrepreneur I charges a price O (i.e., no excess price above the common costs c), the local price must, in so far as entrepreneur II does not underbid, increase with the distance from I and follow the line IA . The excess price above c in the place E is for instance FE = the length of transportation from I to E, and the corresponding cost IE . In case entrepreneur II in each place sold commodities at these local prices, his returns after deduction of the costs of transportation would for every place separately follow

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the broken line BCD. Thus, in the place E the local price would for instance be FE. If from this amount we deduct the cost of transportation to the place of his business, i.e., EII, the price fetched by II for this local bargain will be reduced to G ($FG = IIE$). This cost of transportation decreases the nearer one gets to the place of II's business, at which it is O, but increases once more with the distance, so that the price obtained by II, corresponding to the local prices IA from C, will follow the line CD. (The transportation from I is added and the transportation from II deducted.) - Since entrepreneur II as we assumed does not charge differential prices, he will, when I maintains a price O ($=c$), and the local prices, consequently, cannot exceed the line IA, obtain a maximum profit by charging a price just below C, and thereby be content with the sales to the right of II (IIK). The monopoly profit would be smaller if II set a lower price (for instance $GE \times EK < CII \times IIK$), C being situated below the middle of the line HC produced to the vertical line through K. In a similar way we can now find the monopoly price and sales which entrepreneur II will prefer at each price set by I. Hereby we get local prices corresponding to a series of lines parallel with IA, and the receipts of II will correspond to the segments of the broken line BC and CD. Gradually as entrepreneur I raises his price, the monopoly point of II (i.e., the combination of his monopoly price and sales) will move up along the thick vertical line CP_2 , the vertex P_2 being situated at the middle of the line parallel with BC (through N and P_2) reckoned from N to the point of intersection with the vertical line above K. This point is reached when entrepreneur I charges a price Q, and the local prices, accordingly, can at the utmost correspond

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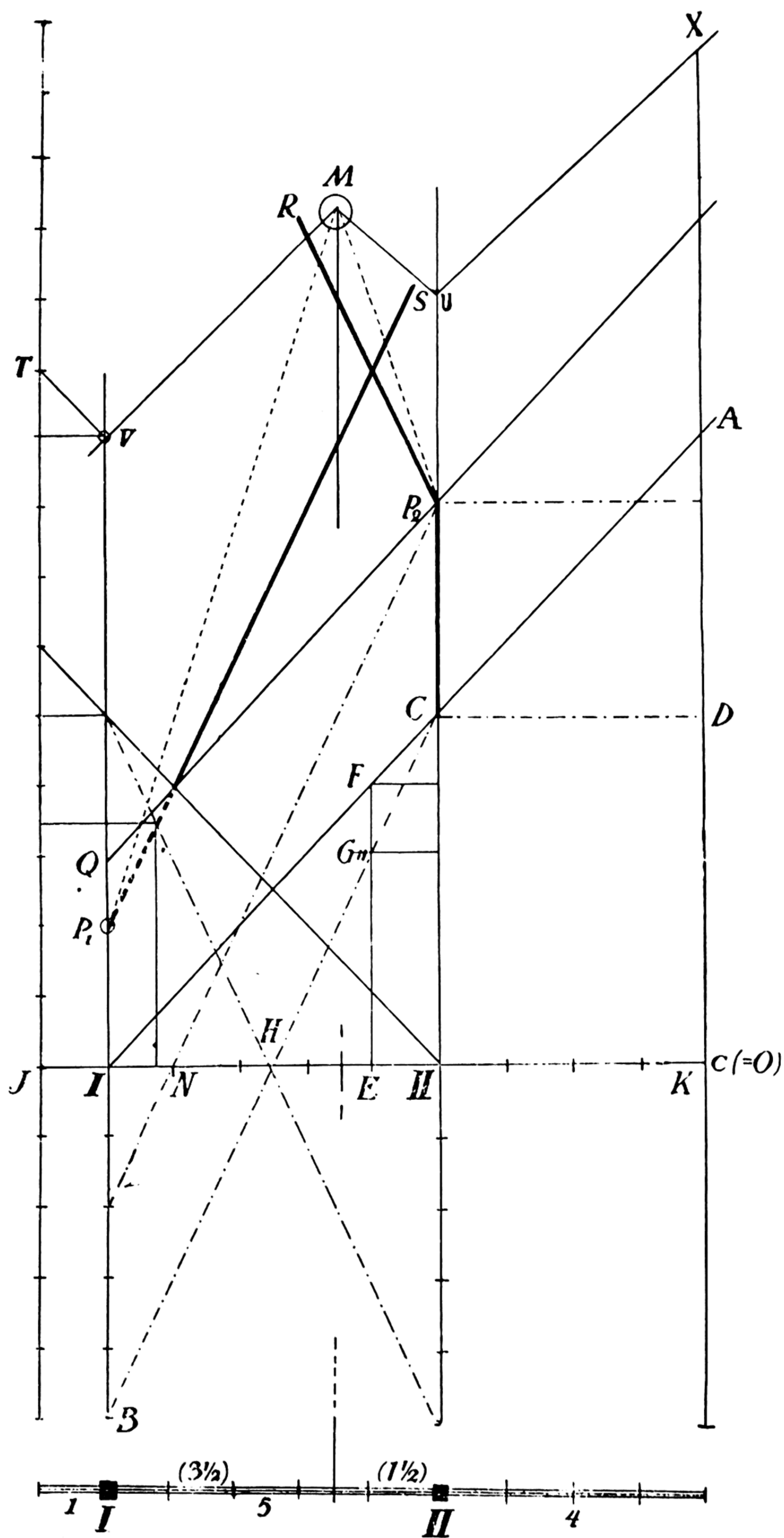


FIG. XV

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to the line QP_2 . The price obtained by II at the sales of IIK is here twice the cost of transportation to the hindmost part of II's special market (IIK). If I raises the price still further, the middle of the lines parallel with BC and NP_2 , reckoned from the cost line JK to the vertical line above K, will fall between I and II; it will move up the thick line P_2R . This signifies that II from that point is interested in extending his sales into the sphere between I and II, even at the expense of the price.

We can now construct a corresponding line P_1S indicating the prices and sales chosen by I when II sets various prices. When II does not go below the common costs c , the monopoly line P_1S will not, like CP_2R , begin as a vertical strip of line, since even at a price of 0 on the part of II it will be to the interest of I to extend his sales to the right of his business. The solution, however, is not found at the point of intersection between these two monopoly lines which denote the prices obtained by the entrepreneurs after the cost of transportation has been paid, and the corresponding sales. On the contrary, it is the corresponding local prices which must be at the same level in the place where the sales of the two enterprises meet. P_2R and P_1S , therefore, must first, by adding the cost of transportation, be converted into the local prices P_1M and P_2M corresponding to the monopoly price at the same sale. As the sloping segments of the monopoly lines P_1S and P_2R , just as the lines BC, NP_2 and other corresponding lines for II and I, have a gradient of $2 : 1$, the decisive local monopoly price lines will have a gradient of $3 : 1$ from the said starting points P_1 and P_2 , which lie at a distance equal to twice the cost of transportation to the hindmost consumer above the dwelling-places of

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the entrepreneurs. The point of intersection M of these lines, determines the division of the market between the two entrepreneurs. The local prices inclusive of freight, paid by the consumers, are found by following the lines which decline with the costs of transportation from M, MV and MU, down to the dwelling-places of I and II. These lines and their ascending continuations to the left of I and to the right of II, VT and UX, indicate the local prices, inclusive of transportation, which correspond to the position of equilibrium. The point on the monopoly lines vertically under M indicates the prices obtained by I and II in the place of their business for sales at the limit of their spheres ; as might be expected, they correspond to the prices paid by the consumers in the places where the entrepreneurs themselves live, V and U.

If we study Fig. XV, it will be evident that the seller who has the greatest special market behind him will find it to his advantage to set the highest price, and consequently, to gain least of the interjacent market. So long as the price in excess of the costs is not double the costs of transportation to the furthest buyer in his special market, it will not be profitable for him to extend his sales beyond that special market. The strips to the left of I and to the right of II are "special markets" for the entrepreneurs in question ; with the assumed proportional costs of transportation and placing of all buyers along a straight line, the nearer and remoter parts of these special markets will be equally exposed to competition, and consequently be preserved completely or not at all, whereas the strips between I and II by a changing of the differences between the prices of the two entrepreneurs gradually pass over from one to the other

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

as a shifting of the limit simultaneously increases the costs of transportation to one and diminishes them to the other.

The case becomes more complicated when at the same time we reckon with an elastic demand in each of the local points of the market. In order to give a complete illustration of reality, however, we must substitute the imaginary linear market by the surface of the earth and its different conditions of transportation, and at the same time reckon with variations in locality and in the quality of the commodities ; also, we must introduce many competitors instead of two. None of these variations will, however, alter the characteristically quantitative and partly monopolistic feature of the determination, but the latter will be extremely complicated, and as it is brought about by means of ordinary human beings, very uncertain.

On the basis of the theoretical case here dealt with, Hotelling makes some interesting remarks as to the choice of situation by new enterprises, and especially as to their quality of production in relation to one another. In order to get the greatest possible special market behind them, they will press hard upon one another, especially when the demand is inelastic. The new enterprise will not seek the point most profitable to the community as a whole, which is at a considerable distance from the existing enterprises, but will approach closely to them on the side of the market most favourable to it, or make a quality which is similar to those already produced, but slightly different in the direction demanded. Production is standardised, the political parties try to be like one another ;—Hotelling concludes, “ Methodist and Presbyterian churches are too much alike ; cider is too homogeneous.”

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4. MORE ABOUT VARIOUS ASSUMPTIONS AND THEIR CORRESPONDING RESULTS

We have seen how enterprises each attain a different size due to their placing as regards locality and production. The same may be the case on account of their different, purely commercial, ability to acquire customers by equal reductions of price and other economic sacrifices. The

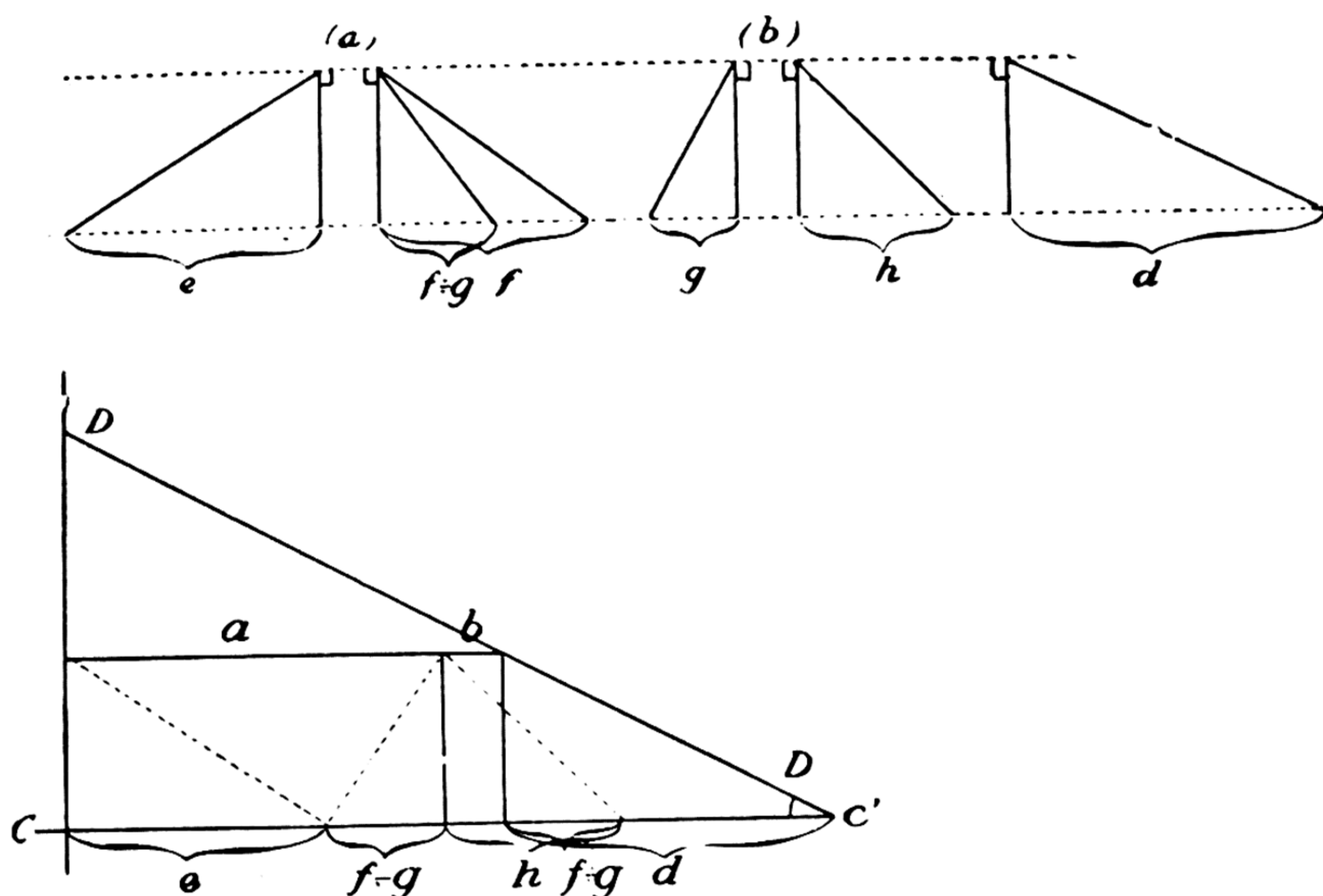


FIG. XVI

example above shows how a position of equilibrium can be established by an adjustment of the price and size of the individual units, when each has a certain capability of extension to the customers of the other party and to the hitherto unsatisfied demand. In Fig. XVI we assume that each entrepreneur extends his business in proportion to the reduction of the price, by taking customers from the other party and by capturing some of the unsatisfied consumption. In this example the difference between the two types of

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extension is that we assume it to be of no lasting importance which entrepreneur is the first to reduce his price when it is a matter of taking each other's customers, whereas to take the lead is of lasting importance when acquiring new customers. The four co-efficients of extension have been illustrated by four acute angles in the upper portion of the figure, and the strips cut off by these angles on an arbitrary straight line parallel to the line through the vertexes (i.e., tangents to the angles) ; e and h indicate the possibilities of extension of the two enterprises (a) and (b) through the capture of fresh consumption, f and g their ability to take customers from each other if only one reduces his price, and $f-g$ consequently denote the net shifting in sales when both reduce the price ; d indicates the common demand curve, i.e., the total sales when both maintain a certain price. If both reduce the price, enterprise (a) will take $f-g$ customers from enterprise (b) ; and as a lead means nothing at this point, it is not possible when one entrepreneur suddenly reduces his price, for him to reckon with anything more than a merely momentary increase of his net possibility of extension towards the other party, which will not exceed $f-g$ or $g-f$. With a reduction undertaken by one party, it is possible, however, to reckon with a big co-efficient of extension towards the unsatisfied demand h or e ($h+e > d$, the extension of the total sales when both simultaneously reduce the price, but $d > h$ and $d > e$) since at this point a leading position is maintained. It would have been more realistic to make the assumptions more complex so that the relative extensions varied according to the price reductions (cf. Fig. XIV, 11 and 12 below). When equilibrium had to be obtained under the assumptions of straight demand and

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supply curves, however, the sales of each enterprise had to equal the possible extensions brought down on the cost line (the monopoly point being at the middle). The sales of the two enterprises can, therefore, be found from the equations $a=e+(f-g)$ and $b=h-(f-g)$, and the total sales are $e+h$, i.e., they are exclusively determined by the exterior possibilities of extension. (The construction of the figure, the absolute magnitude of which is of no importance, is such that you begin by denoting the known quantities along CC' , one after another from left to right, and then bring DD' as well as the vertical lines upwards.)

As will be seen, price and quantity are here determined by the total possibilities of expansion of the enterprises towards the unsatisfied consumption. Their capability of taking customers from one another is only of importance for the determination of their relative sizes (*cf.* also Fig. XIV, No. 8, in which $(f-g)$ is the net power of competition; this quantity is eliminated when a and b are added). If both have an equal and unhindered access to the whole of the unsatisfied market, irrespective of their power of taking customers one from the other we shall have Cournot's case with regard to price and total sales, but possibly an unequal distribution of the latter (Fig. XIV, No. 6). If both undertakings have the same ability of extension towards new customers, and equal power of taking customers from each other, or perhaps none at all, i.e., a net power of conquest 0, we shall have the simpler case illustrated in Fig. XIV, No. 4 where we have two equal enterprises both of which have their policies adapted to their ability to capture more than half the unsatisfied demand, should they be the first to extend their business.

In Fig. XIV, No. 9 we assume, in contrast to Fig. XIV, No. 8 and Fig. XVI, that the question of who first reduces the price is a matter of importance also in attempting to take customers from the other enterprises. When the sales of each activity have to correspond to these increased possibilities of expansion, which must be taken into consideration in spite of the counter threat from the competitor, the price will be lower. If the power of competition is infinitely increased, we again return to the assumptions of absolutely free competition, whereby the price will equal costs (Fig. XIV, No. 1). In Fig. XIV, No. 5 the instance of No. 9 has been simplified by making the two enterprises similar, and in Fig. XIV, No. 10 a numerical example is given, on the assumption that the co-efficients of expansion stand in a constant relation to the sales of the enterprises and to the unsatisfied consumption.

The effects taken into consideration by entrepreneur I when a possible price reduction is contemplated are, as mentioned above, the expansion of sales after he himself has first reduced the price, and entrepreneur II has done the same thing or has had occasion to do so. According to the importance of such a leading position the possibilities, which we have tried to survey in Fig. XIV, Nos. 1-10, may be divided into the following main groups : (1) In No. 1, the case of absolutely free competition, a leading position with regard to reduction of prices is of lasting importance both when it is a question of taking customers from one's competitor and of gaining a new market ; in this instance, the other party cannot recapture his lost customers or keep them by charging the same price shortly afterwards. In No. 5 (the two enterprises similar) the same is the case,

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only the power of conquest is limited, *cf.* the more concrete case, No. 10.

(2) In No. 2, Cournot's case, we have assumed a leading position to be of importance towards the new demand, but not with regard to taking customers from one's competitor ; if one makes a small reduction of the price, which is strong enough to influence new customers, the other party has time to retain his own special customers. The same holds good in No. 4, in which the power of attracting the new demand is limited, also in No. 7 where the same is true, only the two enterprises have a different power of conquest. In the simplified case No. 6, either enterprise has an unlimited power of gaining new customers, but a limited power of capturing its opponent's old ones.

(3) Finally, in No. 3 a leading position is of absolutely no importance on the inner as well as on the outer front, i.e., the market is in reality divided into two independent sections, and price and total sales are as if there were only one monopolist.

5. THE ACTUAL POWER OF EXTENSION VARYING.

DYNAMICS

In all the above cases the indicated demand curve will correspond to price and sales, so long as the competitors charge the same price, and there has been sufficient time for the sales to adjust themselves. In reality, the total sales depend on the way which the development has taken, the different possibility of development being dependent on the relative sizes of the enterprises. If an enterprise for some reason or other has become large, there is every prospect that

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it will remain so. The adjustment starts at a point which may be comparatively accidental, and the demand curve also is somewhat altered, until, if fresh facts do not interfere, a certain equilibrium is attained. In reality the relation is of a dynamic nature, and the decisive feature is not a final equilibrium, but the direction and rapidity of the movement. This relationship has been illustrated in Fig. XIV, No. 12.

Before dealing further with this more complicated circumstance, we shall mention another deviation from the assumptions, with which we have hitherto reckoned. Up to the present we have assumed that the various extensions of sales were in proportion to the reductions of prices, and equal, irrespective of the price with which we started, i.e., that the lines of extension as well as the common demand curve were straight. An enterprise may, however, extend sales a great deal relatively, to a small reduction, or the opposite may be the case as in No. 11, in which it is also assumed that nothing is gained by being the first to reduce the price, and in which, consequently, the total possibilities of extension of the two enterprises are equal to the extension corresponding to a common demand curve. The sales of the two enterprises will here at each price be divided by the curve from the vertex of the figure to A. The area between DD' and DA has, moreover, been marked out exclusively from the y-axis to the dotted curve ending in A₁. One entrepreneur will here prefer the price p_a ; but as the other prefers the lower price p_b , the latter will be the actual price, provided entrepreneur I does not now prefer a still lower price. Nevertheless, the supply of the other enterprise is a concurrent factor in the determination of

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the price, as it puts a limit to the possible sales ; and the monopolistic tendency of the enterprise is apparent by the fact that it does not prefer the possibility of greater sales, down to a position of equilibrium with the costs. It may happen once or even several times that the seller who first prefers a higher price when the other party sets a lower one, prefers one still lower. However, if the individual extension curves do not, as in the case of absolutely free competition, end in a horizontal straight line, i.e., so that a very small reduction in the price continues to give a very large extension of the sales, we shall not descend absolutely to a position of equilibrium between price and costs.

The most complicated, but certainly also the most realistic case, will be found in Fig. XIV, No. 12, in which the initiative in a reduction of the price is of a certain lasting importance. The conditions of equilibrium are here found by considering the possibilities of extension from a certain arbitrary starting-point. (In a similar way the conditions for gaining an advantage by raising the price and limiting the sales, may be examined.) In the figure the point has been chosen in such a way that equilibrium is present, i.e., either of the enterprises are just at the point at which they do not profit from a further extension of sales. Section B of the figure illustrates the circumstances pertaining to one of the enterprises, the sales of which are *b*. Equilibrium is present here, as the actual monopoly profit is equal to the monopoly at a slightly lower price. (This means that price and sales at a very small extension are situated on a hyperbola, the same as that on which the actual price and sales are to be found, and consequently that the point is at the middle of the indicated cross-line intersecting

$b_1=b$.) As to the other enterprise, the actual sales of which are a , it is a question of equilibrium between the monopoly profit at the actual sales and sales essentially larger. (The most attractive extension is here at P , i.e., some way further down a hyperbola like the one mentioned above ; the central point of the cross-line lies between the actual sales and P .) If, as in Section A of the figure, we put the actual sales of a and b together, we get the total sales, and thereby the actual demand at the given price, which means, a point of the "demand curve." The course of this curve cannot be unambiguously indicated, however, because the extension curves in the figure only denote what will happen when one entrepreneur first reduces his prices from the given starting-point, and not what will then happen to the other party. The fact is that one must reckon with other final results if the development runs more quickly or more slowly through a larger or smaller number of intermediary stages from the arbitrary starting-point, also that we should have had quite different conditions of demand if the actual historical starting-points had been different. The last dynamic case, which is the one that is best in accordance with real life, is complicated ; at the same time it is difficult to decide which assumptions or combinations of assumptions to make. Further complications might also be added by passing over to actual dynamics and reckoning with the time which the various stages of the development might be supposed to take, i.e., considering moving equilibrium in which the rapidity of the movement forms one of the variable quantities.

As a résumé of the total number of cases and possibilities, we might say that the price above costs as well as the size of the individual enterprises are so adjusted that for each

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enterprise there is equilibrium between actual monopoly profit and the greatest possible monopoly profit, determined by the possibilities of extension (and limitation) of the enterprise. If there is a discontinuous series of possibilities, there may arise a certain shifting to and fro between different possibilities, until one entrepreneur recognises these, and therefore sticks to his lower price.

The greater the total sum of possibilities of extension for the individual enterprises by each of them being the first to reduce the price, the smaller the monopoly excess price. This includes those possibilities of extension at the expense of others, which can only be gained by being the first to reduce the price (g and e in Fig. XIV, No. 9, but not (f—g) in No. 8). A consistent realisation of the assumptions of a uniform, free and mobile market (Fig. XIV, Case 1) gives no monopoly rent. Such a consistency, however, is unrealistic, a mere marginal case at the most, just like the opposite case of absolute division of the market (Case 3). Cournot's case (No. 2) contains a justifiable reaction, but is arbitrary in so far as it goes to one extreme with regard to the fresh consumption, where absolute mobility prevails, and to the other with regard to the old customers. The very same price as in Cournot's case may possibly be obtained though, by adding just as much to one of these points as is deducted from the other, a solution, which may therefore be taken as a simplified example. It is probably safe to maintain, however, that the price will generally be lower than according to Cournot's assumptions ;—how often this will be the case, and how much it will amount to, is a concrete question of great interest, requiring practical investigations in each separate case. We must add to this that

the demand curve generally follows a declining gradient, and that the monopolistic increase of the price, especially where there are more than two enterprises, will easily be smaller than according to the simple schedule which we employ a number of times, i.e., Cournot's assumptions and a straight line demand curve. The detailed discussion of these assumptions, however, enables the reader to correct deviations caused thereby.

It may be said that there is a difference between the various imaginable cases with regard to rapidity of expansion. Under the assumptions of absolute competition (Fig. XIV, No. 1), the man who first reduces his price will be able to take not only the whole increase of the total consumption resulting from the lower price, but also all the customers of his rivals if they do not immediately lower their prices to an equal extent. Under Cournot's assumptions (Fig. XIV, No. 2), the one who first reduces his price can acquire the whole of the resulting extension of the total sales before the others have time to expand also ; but if he attempts to take customers from the others, the latter will have sufficient time to offer resistance. It is also possible that no change will take place, neither with regard to old customers nor to possible new ones, before the whole of the sellers have had time to discuss every possibility ; here, in the interest of all, they will have no difficulty in agreeing as to the price which will give the greatest total profit (*cf.* Fig. XIV, No. 3). The enterprises may each have different rates of expansion both at different price levels and according as one or the other starts the price reductions. Even if the cases become very complex, we should still, apart from mere marginal instances, be able to find a definite

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equilibrium, which, however, may not be attained until one or several enterprises have been driven from the market. The probability of this result may, perhaps, form the basis of an agreement as to a common price policy involving the greatest profit to the strongest enterprises.

If an enterprise is interested in reducing prices, it may very often cease to do so because profits diminish, as more remote and less willing customers are approached, and because the other producers would also reduce their prices to a certain extent. When costs are diminishing, and costs of transportation play a smaller part, there may yet be a certain interest in a continuation of the price reductions, possibly until the others have been completely driven from the market. In cases where there is a subsequent opportunity of a higher price, the entrepreneurs may, for the present, set a lower price than is immediately the most profitable. Interest and the probability of later profit will then enter into the calculation. The type of equilibrium is here dynamic, but by no means indeterminate, in spite of the fact that the several enterprises simultaneously seek their own ends. There is in each moment a definite price policy which is most profitable to the individual entrepreneur, and which is based upon his more or less correct knowledge of the circumstances, including the policy of his rivals. In a price war, the action of the individual entrepreneurs may presumably be dealt with as closely analogous to a fight between enterprises supplementing each other (*cf.* Chapter IV).

Where each enterprise acts separately, the price will be lower than where they act in common. In order to attain this point, however, the excess profit must be reckoned as

more than compensating for the difficulties, costs and unpleasantness of combination. In such cases it may also be a question of the excess price which an enterprise is willing to pay when buying out the others.

Price differentiation, which forms an important part of the policy of the monopoly, will not be dealt with here, any more than the above questions of price war and combinations or of reciprocity. We have an illustration of price differentiation if in Hotelling's case (Fig. XV) we assume that the entrepreneurs have lower costs of transportation than have the consumers.

6. VARIATIONS IN DEMAND AND COSTS

In the case of the straight demand curve, which we have hitherto assumed in our treatment of competing monopolies, the circumstance that more entrepreneurs entered the market made the price lower. In Cournot's case, where each purveyor had to be in a position of equilibrium with the whole of the unsatisfied demand, the price changed from $\frac{1}{2}$ in the case of one enterprise, to $\frac{1}{3}$ in the case of two, and $\frac{1}{4}$ in the case of three, simultaneous with an increase in the total sales in the proportions of $1.\frac{1}{2} : 2.\frac{1}{3} : 3.\frac{1}{4}$ etc. Also, according to the more complex hypotheses assumed later on, a larger number of entrepreneurs brought about a lower price and a greater aggregate of sales. If the demand curve falls with decreasing rapidity, the fall of the price as well as the increase in sales will be larger than in the case of the straight demand curve, but conversely, when the rapidity of the decline increases. (See the two simple figures given below, in which the demand curve is treated

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as if it were composed of straight lines passing through the possible monopoly points, and in which Cournot's assumptions are also applied.) In Fig. XVII A, where the rate of decline diminishes, the monopoly point, when there is but one enterprise, falls on the steeper part of the curve DD' , but on the less steep part $D'D''$ in the case of two enterprises. The dotted lines indicate what the result would have been if the demand had retained its original steepness. In Fig. XVII B the opposite is the case. By exception, we have here illustrated competition between four enterprises instead of two.

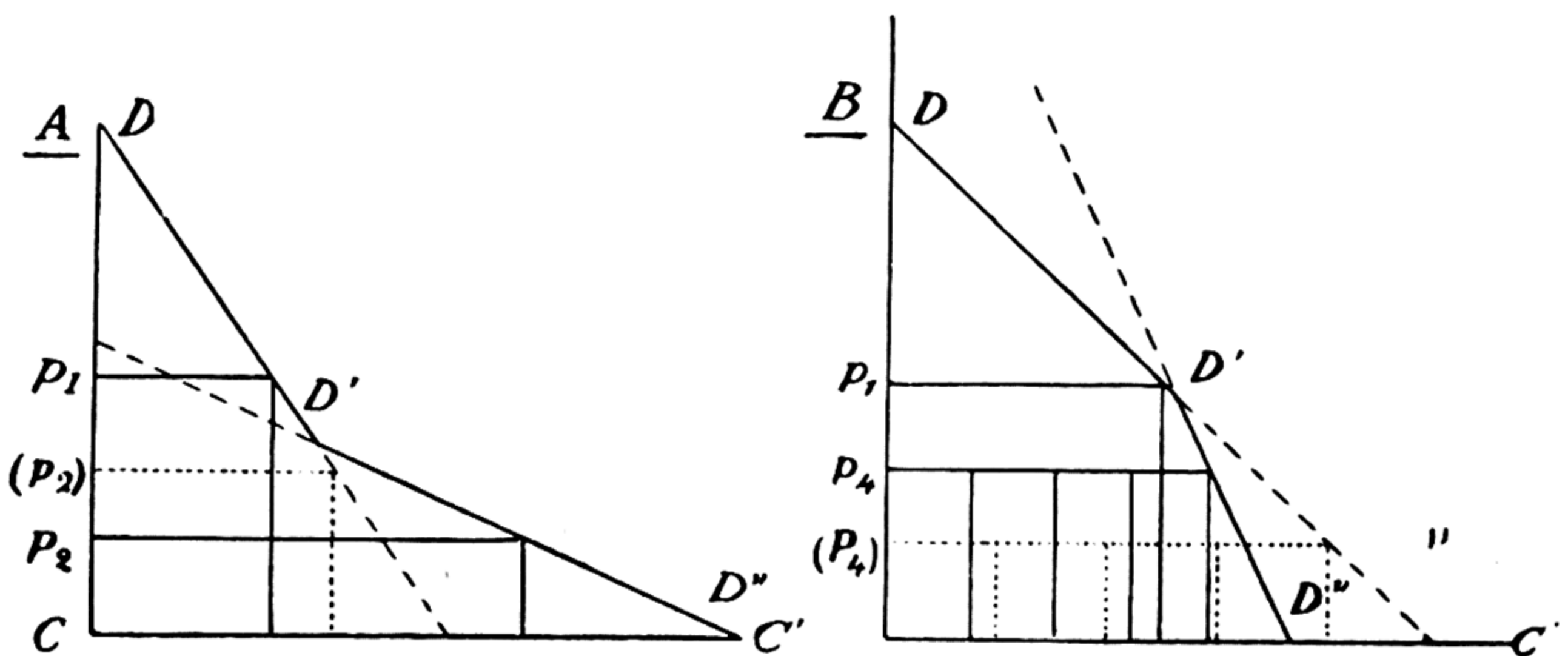


FIG. XVII

A depression in the demand curve spreads out the monopoly points which are most favourable under the various assumptions, whereas a protuberance brings them together, *cf.* Fig. IV.

Circumstances are yet further complicated by the difference in costs for the different enterprises, and because these costs vary at the same time according to the extent of their sales. Figures XVIII A—D below are based upon Cournot's assumptions, i.e., if one of the enterprises makes a small price reduction, it may capture the whole of the additional demand, but none of the sales of its competitor.

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We can in this instance, just as in Fig. VIII, find a line which is followed by the price and sales of an enterprise when a certain portion of the sales has been attracted by rivals. We have a common demand curve (DD') for the two enterprises, and an average costs curve (C_1C_1 and C_2C_2) for each, from which we can construct a monopoly line (m_1 and m_2). If now we add up the total sales of the enterprises at the same possible monopoly price, we shall obtain a line m_{1+2} indicating their total sales at different prices. As the sales must correspond to the demand, equilibrium will be obtained at the point of intersection with the demand curve. This method will bring about a result in cases when the costs are not constant, and when neither they nor the demand follow straight lines (Fig. XVIII B—D).

The figures show how the dearer enterprise gets the smaller share of the sales, and especially how its profit will be comparatively small, so that it will easily pay for the other party to buy it out. Thus, by paying for the capitalised value of the monopoly profit corresponding to the small rectangles (which are cut off by pm_{1+2} , q_1 , C_1 or the horizontal line therefrom, and the y-axis) in Fig. XVIII A—D, the gain will be the capitalised value of the difference between the rectangle, the upper corner to the right of which is the point of intersection between m_2 and DD' (and whose lower corner to the right is situated on C_2) and the large, fully drawn rectangle.

If for Cournot's assumptions we substitute the coefficients of extension of the individual enterprises, which only cover part of the unsatisfied demand and possibly a part of the sales of the rivals, matters will be still more complicated. Here, too, it will be possible, however, to

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construct monopoly lines, which the individual enterprise must follow when sales of varying amounts are deducted as allowances for the appearance of competitors.

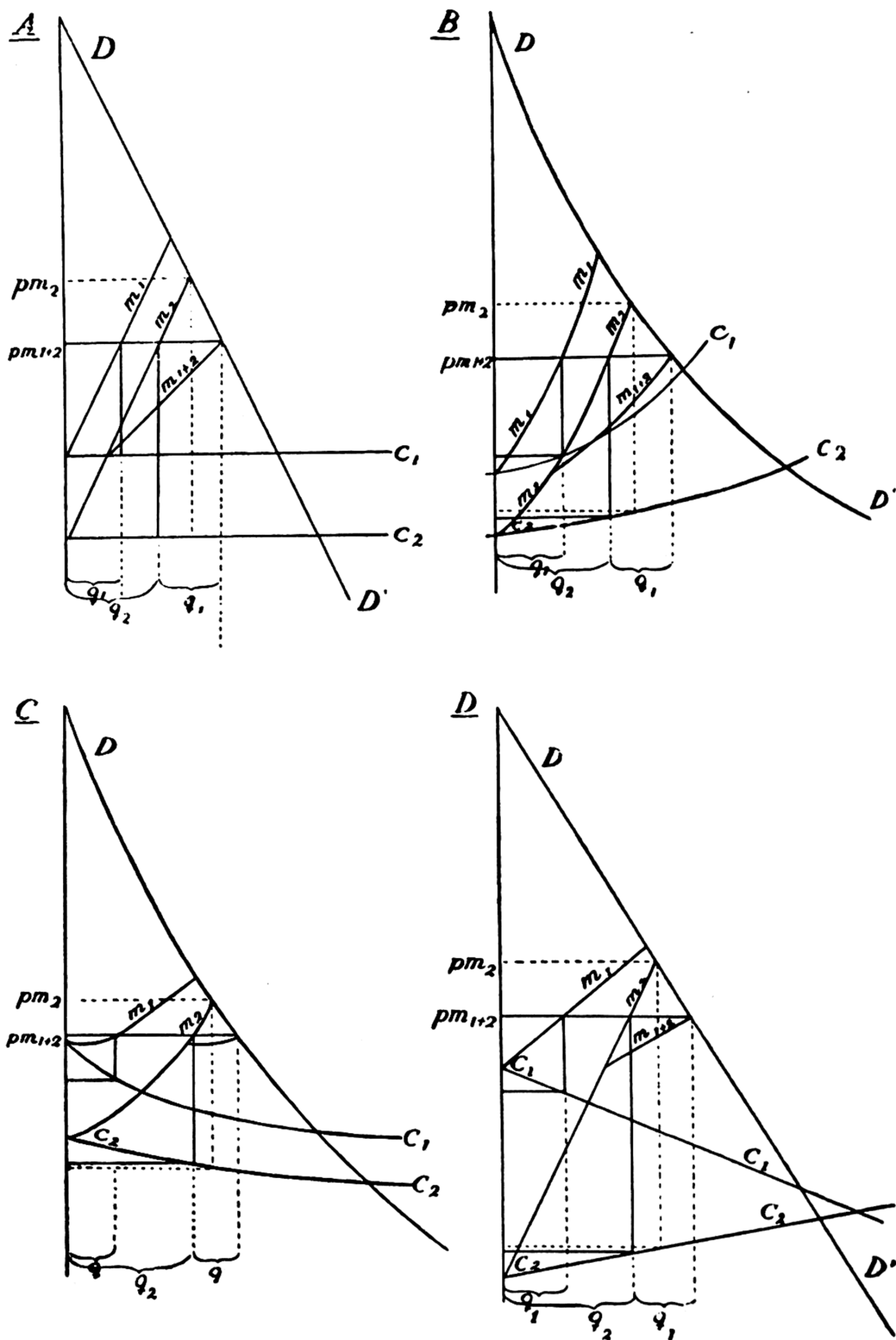


FIG. XVIII

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7. AN EQUILIBRIUM WHICH IS EASILY DISTURBED

That theoretically, there is a definite equilibrium in the case of competing monopolies (competition between a few, relatively large enterprises), does not in any way mean that conditions are at all quiet and stable. The many changes to which the enterprises are exposed both from inside and from outside, owing to price fluctuations, changes in technique and in the circumstances of individuals or the rising and disappearance of other enterprises, for instance, are decidedly less easily and harmoniously transmitted than in the case of competition between many enterprises. It is less essential for the individual enterprise immediately to conform to a definite price. The proceedings of the individual will depend on what the others have done or have omitted to do, and even if there is a tendency towards a common position of equilibrium, the intermediary stages will be of great importance, whilst if the conditions are constantly changing, nothing but intermediary stages will ever be reached. The smaller differences in profit which may result from a change in price policy in the case of monopolies as compared with competition, apparently offer a certain freedom, at any rate they do not necessitate so hard and fast a compulsion as in the case of competition. The estimate of what will be the right conduct will, at any rate, be more complicated. That, nevertheless, a definite solution can be found, is also borne out by experience in the way that it pays to find the best price policy, and that quiet circumstances may arise in cases where several enterprises obtain a monopoly profit without any common price policy. Economic theory alone, however, teaches us that under normal circumstances

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there will at each given moment be a tendency towards one definite position of equilibrium.

The equilibrium which we have here described as "monopolistic competition" is, however, unsteady not only because the assumptions are constantly changing, but also because the necessary conditions for competing monopolies may entirely disappear owing to the greater advantage either of a struggle for existence or of a combination. The passing over to a form of absolute monopoly presupposes either an amalgamation of the several enterprises into one or that the individual entrepreneurs have confidence in one another. Mutual feeling and confidence may here arise and develop gradually, and to a small extent only, and raise prices up to a level between those of competing monopolies and absolute monopolies.

When there is no prospect of fellow-feeling, each enterprise finds it to its greatest advantage to raise its prices to the level of those of the competing monopoly; but this limited monopoly policy affords a natural basis for a continuation of the increases in price in the hopes of a similar policy on the part of the rivals. In the case of competition between a few enterprises the resultant limited monopoly policy is not due entirely to a monopolistic "mentality," but has an objective foundation, upon which the said mentality may be built.

Under constant costs the increase in the number of enterprises competing in a market may lead to a reduction of the price; if the demand curve, as is normally the case, falls with decreasing rapidity, the decline in price will with Cournot's assumptions be greater than in the proportion of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ etc. If rapidly increasing returns prevail (and

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consequently increasing costs by an allocation of the sales among several firms, as for instance in the very small retail trade), this may outweigh the reduction of the monopoly profit which results from other entrepreneurs entering the market.

The decisive point is the proportion between the rapidity of fall of the demand curve and the average costs of the individual enterprise. The inelastic market in connection

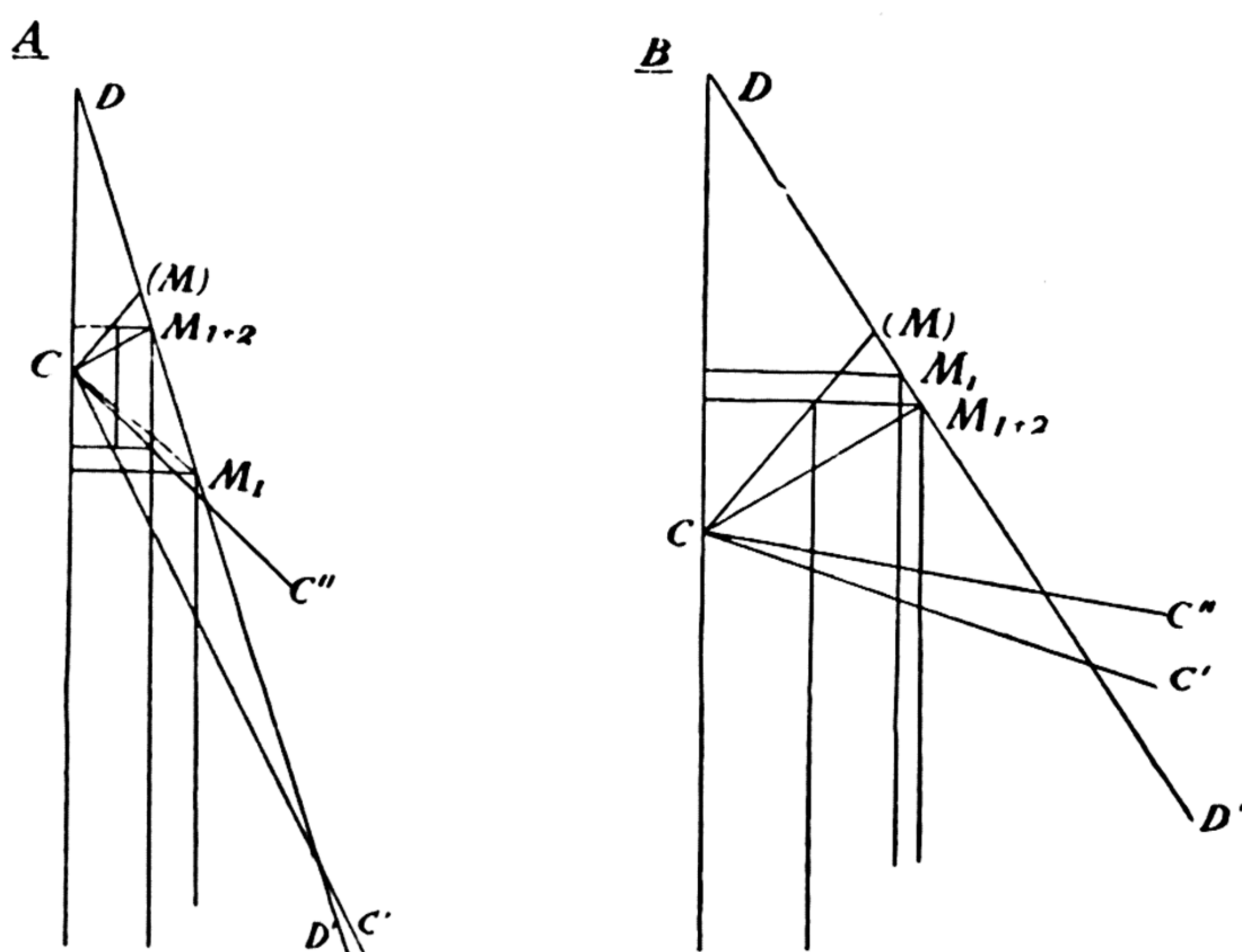


FIG. XIX

with the rapidly diminishing costs in Fig. XIX A will lead to a lower price when there is only one enterprise pursuing an unlimited monopoly policy, than when two are competing as under Cournot's assumptions, whereas the price will be higher in Fig. XIX B, *cf.* Fig. VIII C and D. (When there are two enterprises, the average costs in either, will be found at half the total production, i.e., the line indicating the average costs for one enterprise, CC' , is substituted by the line CC'' . The latter curve, declining with only half

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the rapidity of the former, indicates the average costs for either of the two equally large enterprises, which share the market. With the costs CC'' and one enterprise, the monopoly line would be $C(M)$; with the same costs and two enterprises acting in accordance with Cournot's assumptions, they would be CM_{1+2} . With one monopolist price and sales are to be found at M_1 .)

The arrival of other competitors, consequently, need not force down the prices ; but we may assume that the instances in which this does not take place are uncommon, as the costs per unit, in order to obtain the result indicated above, must decline more than half as rapidly as the demand, and they generally vary approximately in the proportion of a constant divided by the sales plus a constant per unit of production. As, moreover, the power of extension must generally be supposed to be greater than according to Cournot's assumptions, the occurrence of the incidence is still more difficult. Competition between a few undertakings actually required a more detailed treatment of a technical and dynamic character, in the course of which unused capacity and overhead costs had to be taken into consideration. The attempts of one enterprise to destroy or suppress the other by means of price reductions, involve economic warfare, to a certain extent analogous to that dealt with in Chapter IV.

8. COSTS, MONOPOLY AND COMPETITION

However, which items of income are costs, and which are monopoly profit in real life ? In single, imaginary cases we may say that the costs consist of the price of the services of production which holds good in other uses, and when

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

these are of sufficient importance as compared with the case under consideration, the costs may be taken as given. The monopoly profit may then be found to be the excess profit which is obtained when the number of enterprises is limited. If now, for instance, a class of business men have a series of possibilities in spheres of limited competition and another series of possibilities in spheres of unlimited competition, their prices will, according to the law of substitution, in each of the spheres be determined by the total possibilities. That is, the costs both in monopolised and in non-monopolised spheres will be due to some extent to competition with monopolistic opportunities—not to realised monopoly profit. The same will be the case with regard to the demand for new capital. The *actual* possibilities of a monopoly profit will thus help to constitute the costs of other enterprises. As, generally, one or a few enterprises possess a not inessential local or quality advantage, the markets abound in small and big monopolies, which again are effective in determining the costs. The community is not only, as has been said, “a dense liquid”; it is rather a question of adjustment between solid bodies of various form, size and elasticity, which among other things entails that not all the space occupied by the bodies is exposed to the same pressure. It is not only a question of a limitation of the earnings (costs) and a free extension of these (profits and rents), but of an elastic, limited extension under varying pressure, *cf.* the end of Chapter III, §4, dealing with the adjustment between a limited number of competing or opposing enterprises.

The minute splitting up of the markets of commodities owing to differences with regard to situation and quality,

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is intensified by the great individual differences of labour and of the material means of production. Neither the representative firm, the normal wage, nor even the normal rate of interest exist. Prices are determined by greater or smaller competition between a number of unequal enterprises, workmen, etc. As the general or normal level in each of the spheres mentioned, is only an arbitrary, statistical conception, there will be no reason, either, to consider the tops above the level—the more than “normal” profits—as quasi-rent or the like, under a particular price determination.

Where opportunity offers, the individual person or enterprise will try to obtain an advantage in their determination both of price and of production, and because the two are dependent one upon the other, by the contemporary determination of both. When there are a great number of enterprises not pursuing a common price policy, each counting but little in the market, we have a marginal case. Here the individual seller is faced with a given price, and can only vary his sales accordingly. His natural selling policy has lost one dimension. Approximations to this marginal case may often be found in every-day life, and the case is, moreover, of theoretical interest because in it we perceive a general equilibrium between costs and prices. If we wish to understand the determination of prices in all the large spheres in which one or a few enterprises are more favourably situated than others, however, i.e. to understand real competition, we must have a knowledge of the theory of monopoly and of competing monopoly, i.e., the cases in which the selling policy has retained its two dimensions and is, moreover, a price policy.

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

Neither monopoly nor competition are ever absolute, and the theories about them deal only with the outer margins of reality, which is always to be sought between them. A treatment of reality as if it were identical with one of the marginal instances is one-sided and mistaken, whilst the correct indication of the margins alone, is insufficient ; consequently we ought to study this sphere of reality instead of the purely marginal instances.

CHAPTER III

BILATERAL MONOPOLY

I. THE PROBLEM

IN the first chapter and with certain modifications in the second we considered cases in which only one party to the transaction, either the buyer or the seller, carried on a monopolistic price policy. For the most part, we dealt with selling monopoly, but, as mentioned in the beginning of the introductory chapter, much the same may generally be said about a buying monopoly as is said about one of selling. One or a few sellers were considered as faced by a large number of buyers, who did not pursue an active price policy. Where one enterprise possesses an absolute or even a partial monopoly, it appears autocratically to set a price according to its own estimate of what will give the greatest returns, and the many competing enterprises with which it has to deal react to its price policy by each buying a definite quantity, and this again, causes a definite total amount to be sold.

Where there is unlimited competition on both sides of the market, the settlement of price and quantity sold is apparently quite automatic, not leaving any room for an active interference on the part of any of the parties concerned.

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

If, in the third type of case with which we are to deal in this chapter, there are two absolutely monopolistic enterprises or combinations which deliver different materials or services to be used in a fixed proportion by a number of competing producers, they will both be interested in pursuing an active price policy. The dispositions of one party must, however, fit in with those of the other, and *vice versa*, so that the case, just like that in the preceding chapter of two competing enterprises, should in advance seem to be indeterminate. If we consider actual examples, we have in all essentials the same case when two monopolistic concerns face one another as buyer and seller, *cf.* § 5 below.

The two opposing undertakings or organisations may possibly have a series of opportunities in other fields, giving them a scale of prices of substitution corresponding to the extent of the sales. This results in a cost or a scale of costs for the special field.

The other determining factor is the demand for the common product. As a preliminary instance, we assume the simple case in which two commodities or services are used together in a fixed proportion. The classic example is that of Cournot's¹ two monopolised copper and zinc mines, the products of which are used jointly for the production of brass. Cournot, and after him Wicksell¹ forwarded a definite solution of the price question, one which is illustrated in graphic form below.

¹ On the whole we may refer the reader to the same authors and works as on pages 25-26 above. On the one hand Cournot (Chapter IX), Wicksell (the same article on page 270 below), and Schumpeter in his introduction to this article, and in the *Economic Journal*, 1928 (pages 370-371). On the other hand Edgeworth (*Papers I*, page 111), Marshall (page 493), Pareto (No. 141), Bowley, *Groundwork* (page 62) and *Economic Journal*, 1928 (page 651), Pantaleoni, "An Attempt to Analyse the Conception of 'Strong' and 'Weak' in their Economic Connection" (the *Economic Journal*,

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This solution is disputed by almost the same authors as those who criticised his standpoint with regard to monopolistic competition.

2. SOLUTION OF THE SIMPLIFIED INSTANCE

The problem is the same as that of a few competing enterprises : What does the individual enterprise determine, price or sales or what ? We shall obtain a wrong solution in both cases if either we suppose that one entrepreneur first fixes the price which with definite sales will give him the greatest possible profit, or that he fixes the sales which at a definite price will achieve the same purpose, leaving the other entrepreneur to fix his sales or prices, as the case may be, so that under the actual conditions he gets the greatest possible profit (*cf.* Bowley, "Bilateral Monopoly," in the *Economic Journal*, 1928, page 653. One solution is obtained when the manufacturer first sets his price and the purveyor of a raw-material or labour then determines his sales, and another, when the purveyor of a raw-material or labour sets the price, and the manufacturer on this basis determines how much he wishes to buy). If a distinction were to be made between the position of the parties with regard to price and sales, it would be proper to say that in this case of bilateral monopoly, either party decides his own excess price, whilst the sales of both are necessarily equal. In the case of

1898). Above all, we shall refer the reader with regard to the problems—but not with regard to the solutions—in this and in the following chapter, to Pigou, *The Principles and Methods of Industrial Peace*, Appendix A, *Economics of Welfare*, III, iv, "The Equilibrium under Bilateral Monopoly" in the *Economic Journal*, 1908, and "Monopoly and Consumers' Surplus" in the same Journal, 1904.

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

monopolistic competition, on the other hand, the price must be the same for both ; if one party have fixed their sales, the other party are able to fix theirs, and thereby the price. Hence, like Cournot and Wicksell in their treatment of monopolistic competition (see above Figures XI and XIII), it is convenient to try and find a solution by at first regarding the sales of one entrepreneur as given ; however, it has also been shown (*cf.* Figures XII and XVI) that it is possible to find a definite equilibrium by means of simultaneous variations in the prices and sales of both enterprises. The same is shown below with regard to bilateral monopoly (*cf.* m_{1+2} in Fig. XX, 3).

In Fig. XX, 1-7, we have illustrated two enterprises supplying monopolised and indispensable raw-materials for the manufacture of the same articles in a mutually fixed proportion. For the present we may assume that the two raw-materials are used by a great number of competing manufacturers. Let us suppose, as in Section 1 of the figure, that entrepreneur No. I sets his excess price at $\frac{1}{2}$, between D and C (i.e., so as to obtain the greatest possible profit if entrepreneur Number II were to provide the same quantity, and consequently, as will be seen in the diagram, get no profit)—then it would be profitable for entrepreneur Number II to set an excess price of $\frac{1}{4}$. If the latter were to set his excess price at $\frac{1}{4}$, however, the sales would also be reduced to $\frac{1}{4}$. When entrepreneur I takes a certain excess price above the common costs CC' , the total sum of excess price and common costs, $C_1C'_1$, will form the basis of the dispositions of entrepreneur II, in the same way as the new derived demand curve is obtained in the treatment of monopolistic competition according to the assumptions of

BILATERAL MONOPOLY

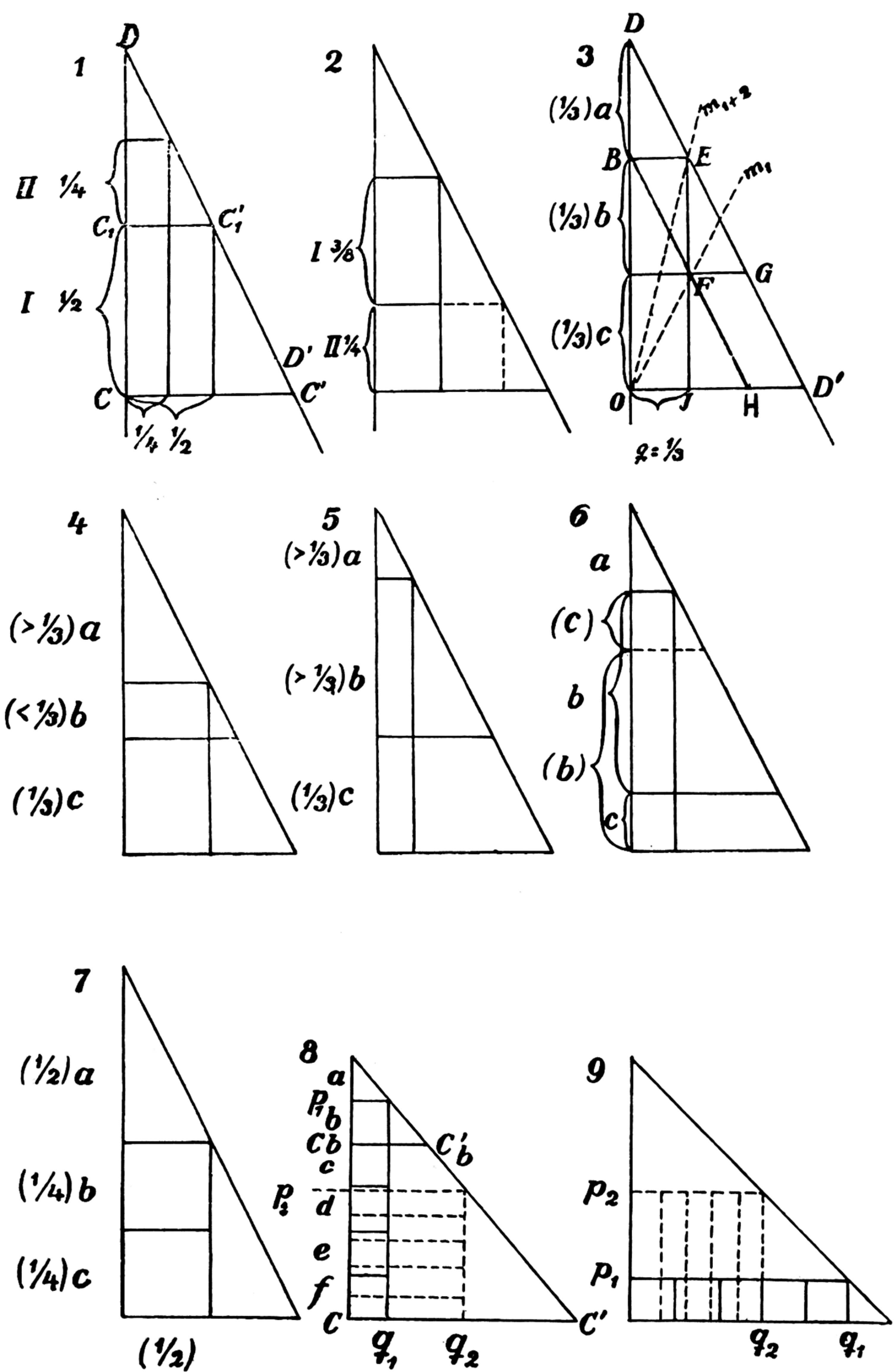


FIG. XX

Cournot. Now it will be to the advantage of No. I to reduce his excess price to $\frac{2}{3}$, *cf.* Fig. XX, 2, where the prices of entrepreneur No. II have been indicated at the bottom, as the basis of the price policy of entrepreneur No. I. Entrepreneur No. II, in his turn, will find it profitable to raise his price, whilst entrepreneur I will reduce his, until they both meet at the same excess price of $\frac{1}{3}$, *cf.* Fig. XX, 3. Either of the entrepreneurs is here in a position of equilibrium facing the same opportunity of taking an excess price, DB. If one entrepreneur charges a price c the other will set his price so that $b=a$; but the two enterprises are in absolutely the same situation, hence $a=b=c$. The sum of the total excess price will be $\frac{2}{3}$, and the sales $\frac{1}{3}$. In this case we may, as in Fig. XI, begin by drawing a line parallel to the demand line and somewhat below it, *cf.* the line through B, F and H. This line does not, like the corresponding line in Fig. XI, indicate a certain amount of sales for one enterprise, but a certain excess price reserved for it. The second enterprise will now consider BFH its demand line and fix a price midway between B and O, and sales in the middle of O and H. As the former enterprise is in exactly the same situation, we obtain $a=b=c$.

The same result may also be obtained in another way; if a monopolist were alone in the market, the combinations of prices and sales preferred by him would follow the line of m_1 . If there were two monopolists supplementing each other, either of them would at each quantity sold take a corresponding excess price, i.e., the sum of total excess prices would be m_{1+2} . Both the parties would discontinue the alterations of their excess prices until price and sales had reached the point of equilibrium, i.e., the point of intersection

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between DD' and m_{1+2} . Here both enterprises would obtain an excess price which, with the given quantity sold, would give the greatest possible profit. (That the price for the two materials together would be $\frac{2}{3}$, is evident from the fact that the three triangles DBE , EFG and FIO are similar, and that their vertical sides are equal, as m_1 reaches the middle of DD' and the length of the vertical sides $EF=FI$.)

A higher excess price equal for either party would make the individual entrepreneur interested in a reduction of the price ($b > a$; $c > a$), and a lower excess price in an increase ($a > b$; $a > c$) ; however, different excess prices, as in No. 6, would make one interested in an increase and the other in a reduction of the price, or, as in the other cases, give one party a more lasting interest for increase or reduction than the other. If one enterprise, as in No. 4, has set a price equal to the final price of equilibrium, and the other party has set a lower price, the latter will be interested in an increase in the price ($a > b$). In No. 5 the opposite is the case. If, as in No. 6, one party has set a price above $\frac{1}{3}$, and the other party below $\frac{1}{3}$, one of them at least will be interested in a change of the price as either $b > a$ or $a > c$ or both may be the case. In all imaginable cases there will be a tendency in the same direction. In No. 7 we see that $b=c=\frac{1}{4}$, which gives the parties concerned the greatest profit ; nevertheless, the individual enterprise will here find an immediate advantage in raising the price, a tendency only to be checked by a belief that the other party is keeping down the price in the common interest of both. The express or tacit vertical agreement or combination will, in contradistinction to the horizontal one, result in larger sales

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

and lower prices, but in both cases the total profit will be increased.

When each takes an excess price of $\frac{1}{3}$, neither of the enterprises has any immediate advantage in reducing or in raising the price. This position of equilibrium, however, only continues as long as new conditions do not appear, as for instance when the parties either find it profitable to unite or when one of them finds a lasting advantage in a policy of temporary warfare. In reality these conditions will very often result in a monopoly in the long run.

In Fig. XX, 8 we have not two, but five entrepreneurs all in a certain fixed proportion supplying monopolised raw-materials or services for the manufacture of the same article. The price p_1 will here be very much tightened up, and the quantity sold, q_1 , strongly reduced, since each entrepreneur will fix his monopoly price at the top of that of the others. The last monopolist (b) adds the monopoly profit of the others (c...f) to the common costs CC' . In other words, the cost line, on which b bases his dispositions, becomes $C_bC'_b$, the others making their dispositions in the same way ($a=b$, $a=c$, $a=e$). The five entrepreneurs may, however, combine, and thus, as is indicated by the dotted lines, take the greatest total monopoly profit (p_2q_2), and afterwards share the excess price between them. By way of comparison we have in No. 9 illustrated the case of a number of competing enterprises in which the settlement takes place according to the assumptions applied by Cournot. (If we reckon with other assumptions illustrated in Fig. XIV, the result will, normally and generally, be a weaker tendency in the same direction.)

Whilst several competing monopolists set a lower price

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than a single one, several opposing monopolists, i.e., those whose services supplement each other, set a higher price than the single monopolist. In the case of the straight demand curve one monopolist gives the price of $\frac{1}{2}$, two opposing monopolists supplementing each other, the price of $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$, 3 : $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$, etc., whilst at the same time the quantity sold is reduced to $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, etc.; also, the total amount of monopoly profit is reduced, although at a slower rate, to $\frac{1}{4}$, $\frac{2}{9}$, $\frac{1}{6}$, etc. A vertical combination of several hitherto independent monopolists will consequently reduce the price whilst at the same time increasing the sales and the total profits; a horizontal combination, though likewise increasing the total monopoly profit, will also increase the price and reduce the sales.

Our conclusions, however, can only with strong qualifications be applied to real life, and are to be modified when we abandon the assumptions of a straight demand curve and constant costs. Furthermore, it is an equilibrium under conditions which may easily cease to exist; by agreement the individual entrepreneurs may operate together, or one of them or an outsider may purchase the majority of the stocks of the rivalling concerns, thus uniting them in a common purpose. On the other hand, they may try to force one another by temporarily stopping supplies or by using other measures of persuasion or force. The pure case in which two absolute monopolists are opposed, will in all probability seldom exist for very long without changing into a case of fighting or of co-operation. The pure and simple case, however, is dealt with in great detail, because it illustrates in the most comprehensible form an element which, if the theoretical analysis is correct, must be found

many times but to a smaller extent and less obviously in real life.

We had to consider Cournot's special solution of the problem of monopolistic competition as an accidental marginal case, since the power of extension of the enterprises towards new customers and towards the old customers of the other enterprises, was more complicated than he conceived of, *cf.* the discussion illustrated in Fig. XIV. However, his solution with regard to bilateral monopoly really seems to be precise under conditions which may very well occur to a not inconsiderable extent. These conditions, to be sure, may easily be replaced by others, those of co-operation or of fighting, for example, which, moreover, as will be seen later on, are impossible in certain instances on account of the shape of the curves.

3. DEMAND AND SUPPLY CURVES

If the demand curve, as is normally the case, falls with a decreasing gradient, the price will rise higher, and the sales decrease more than in the example illustrated in Fig. XX, by the monopoly becoming bilateral, see Fig. XXI, in which the monopoly point for one monopolist p_m, q_m is to be found in the middle of the more level part of the demand curve $D'D''$, reckoned from axis to axis; on the other hand the bilateral monopoly point p_d, q_d is at a distance of $\frac{1}{3}$ from the top of the steep piece DD' , also reckoned from axis to axis.

As long as we assume that the two commodities or services are to be used in a fixed proportion, the total costs of the two, which often only means the substitution prices of the commodities in other uses, will form the basis of the calculation

BILATERAL MONOPOLY

of profit. In Fig. XXII A, C_{a+b} C'_{a+b} are the common average costs. Equilibrium will here be attained at an excess price for either enterprise equal to $\frac{1}{3}$ of the line DC_{a+b} . (The

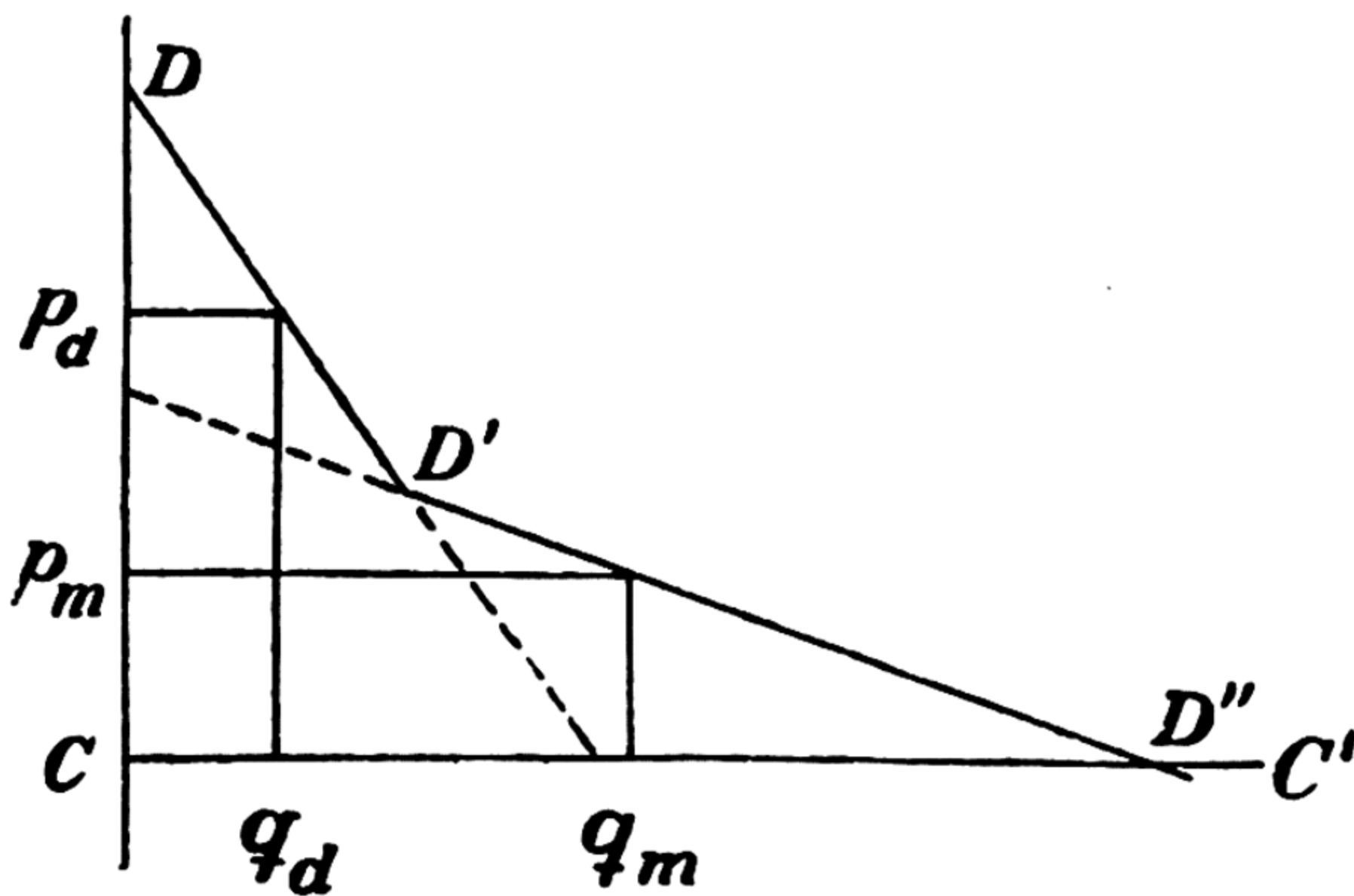


FIG. XXI

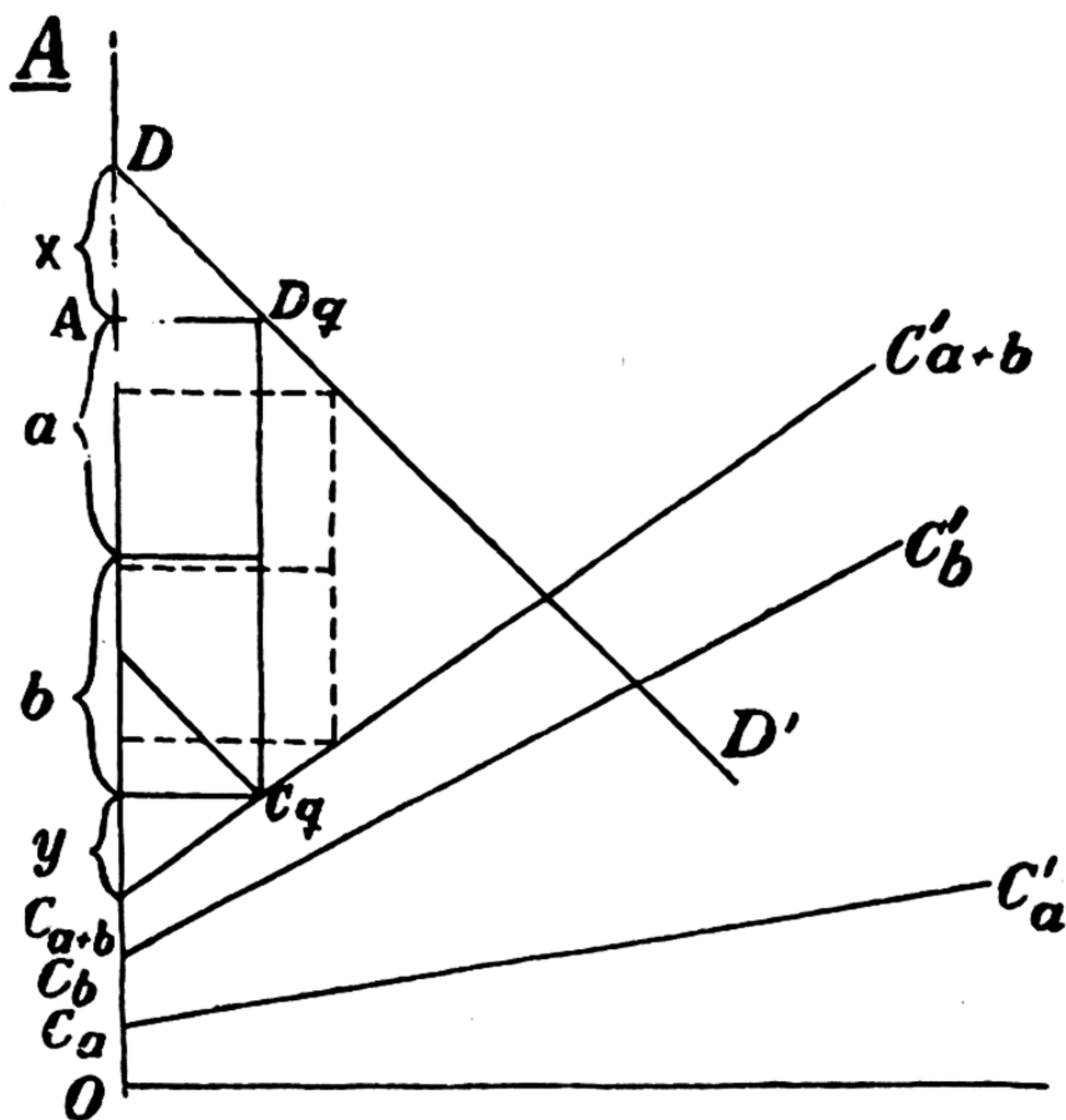


FIG. XXIIA

construction is obtained by dividing DC_{a+b} into three equal parts, and from the point $\frac{1}{3}$ above C_{a+b} drawing a line parallel to DD' , which cuts C_{a+b} C'_{a+b} at C_q , and from there a vertical line to D_q whereby we get D_qC_q equal to $\frac{2}{3}$ of DC_{a+b} . The

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quantity sold will then be AD_q , and the excess price of either enterprise $\frac{1}{2}$ of D_qC_q . Either of the enterprises must, when the excess price of the other party has been deducted, have an excess price of a or b equal to $x + y$.)

Each of the two enterprises try to obtain the greatest possible total profit within the market of the monopoly, and if possible, outside it. We may imagine them to have capital invested in the monopolised sphere, which only can yield a profit within this zone, and that the costs indicated in the figure are paid to somebody else for service, materials, etc. It is also conceivable that the parties may themselves use their means of production in other spheres; the costs will then indicate how much must be deducted from the returns in the outside area by transferring a certain quantity of productive agents to the monopolised zone. In this sphere the monopolist or bilateral monopolist acts on the basis of a calculation of the total maximum profit, into which the average costs enter as a simple intermediate link. These, however, have again been determined by the marginal costs in the monopolised sphere.

Fig. XXII B illustrates a similar case with decreasing costs ($a=b=x-y$), and in Fig. XXII C we have, finally, an approximate solution of a case with irregularly shaped demand and common cost curves. The object here, as in the other cases, is to place a rectangle, the upper and lower half of which cannot be increased by price variations, in the space between the y -axis and the two curves. This entails finding the maximum for one of these parts as long as the other half remains unchanged. Here, certain exceptions apart, we shall have a definite solution of a similar kind to those of the simpler cases. It will appear from No. 6 and

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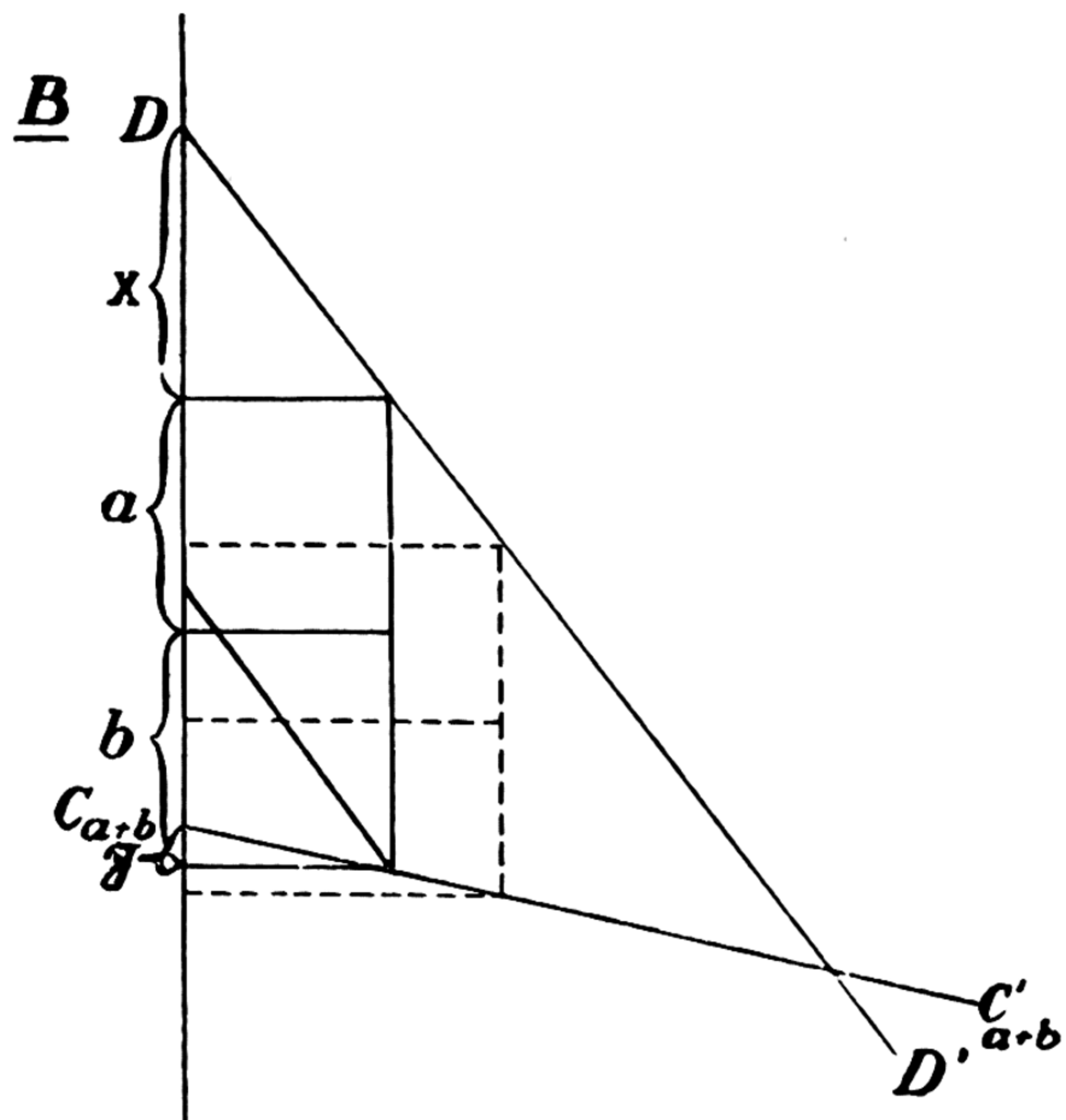


FIG. XXIIb.

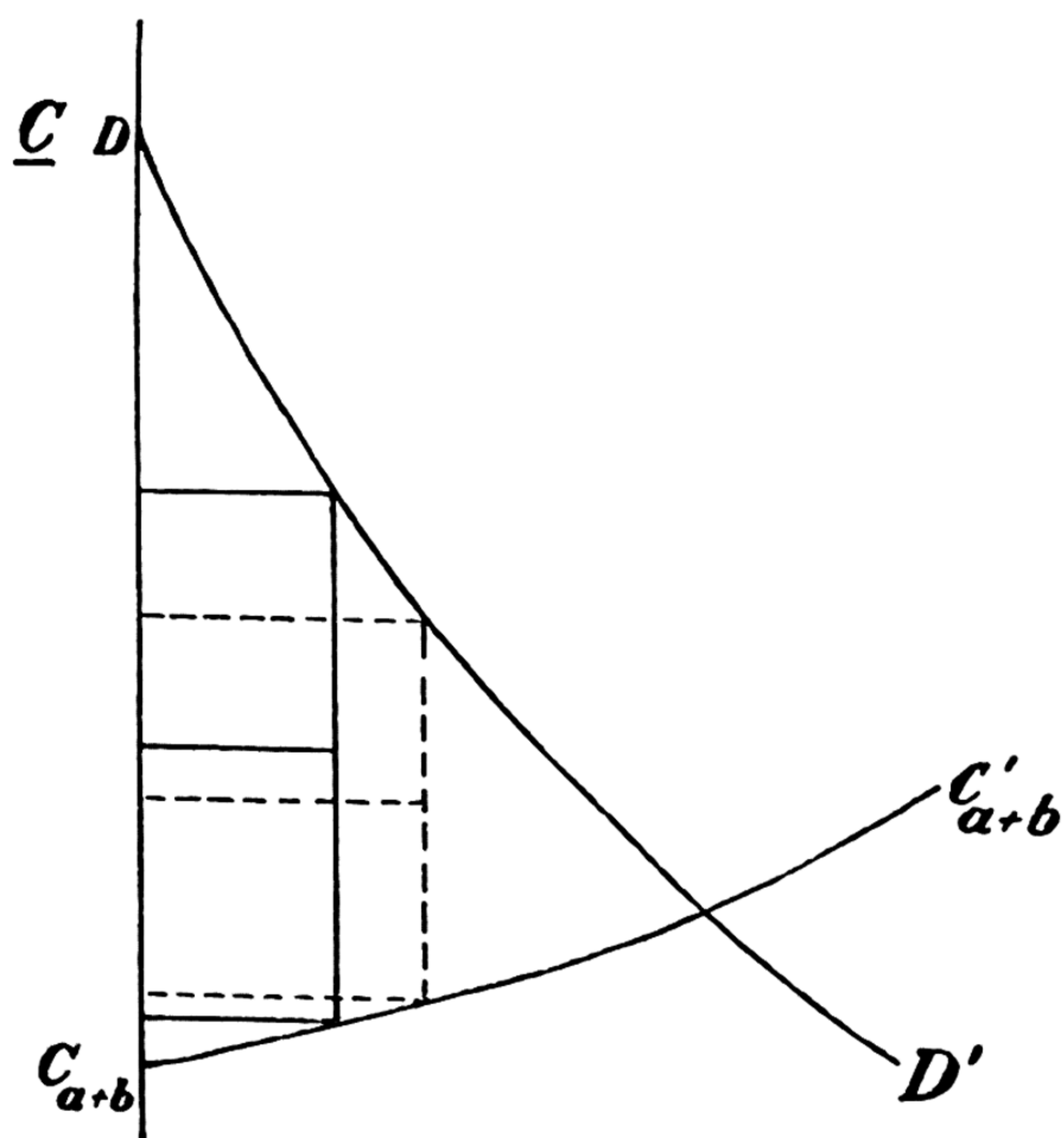


FIG. XXIIc.

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

the following paragraphs of this chapter, however, that it is a problem of whether a definite solution can always be obtained through the adaptation of prices and sales by the opposing monopolists. In several cases there is but little possibility of such an adjustment, and either one or both of the parties will prefer fighting or coercion through a threat to fight.

As will be seen, the dotted quadrilateral in Fig. XXII, A—C indicating the monopoly profit of a single monopolist or combination, is in all cases greater than the total profits of two separate monopolists, and the quantity sold essentially larger, whilst the total excess price is somewhat smaller. The difference between simple and bilateral monopoly, like the difference between monopoly and competition, is greater under decreasing costs, and smaller under increasing costs. In the latter case the firms which produce more cheaply than the others have already acquired a profit, which under monopoly forms part of the monopoly gain.

The example of an equilibrium obtained under bilateral monopoly on account of the free adjustment of prices and sales by the parties concerned, is so far unstable, and can easily be replaced by other solutions : fight or combination.

4. ATTEMPT AT A GENERAL FORMULATION OF RESULTS HITHERTO OBTAINED

In this and the preceding chapter a series of questions concerning the fixing of prices in markets with a limited number of entrepreneurs, have been illustrated by means of special and simplified cases, each containing certain elements

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which to a greater or smaller extent may be found in real life. In this constant modification of the first and simplest cases, now on one point and now on another, we have assumed a certain interplay between the circumstances which we have successively discussed. For instance, there is undoubtedly a definite solution when there are in a market several competing sellers faced by several mutually competing buyers, and when at the same time each enterprise has a different power of extension (partly owing to an unequal ability to attract customers and partly to greater or smaller proximity to the latter) or when the enterprises at the same time have unequal and differently varying costs. This contemporary solution of all questions must be composed of features harmonising with each of the special solutions.

For the present the treatment of the fundamental questions of detail is bound to be experimental and uncertain, and the attempt at a comprehensive solution must, of course, to a still greater extent be in the nature of a sketch.

Fig. XXIII, No. 1, illustrates a market with constant cost CC' common to all entrepreneurs, and an evenly declining demand. Static equilibrium is assumed, and the sales accordingly correspond to the sum of the extensions which each of the individual enterprises would undertake if it first reduced its price to O , and the others were allowed time to follow suit (*cf.* page 33). When the units of measurement for price and quantity are so chosen as to make the strips of line intersected by the demand curve on either axis equal to 1, we shall have $t + p = 1$; t indicates the total sales at the point of equilibrium as well as the above-mentioned sum of extensions in case of alternating and

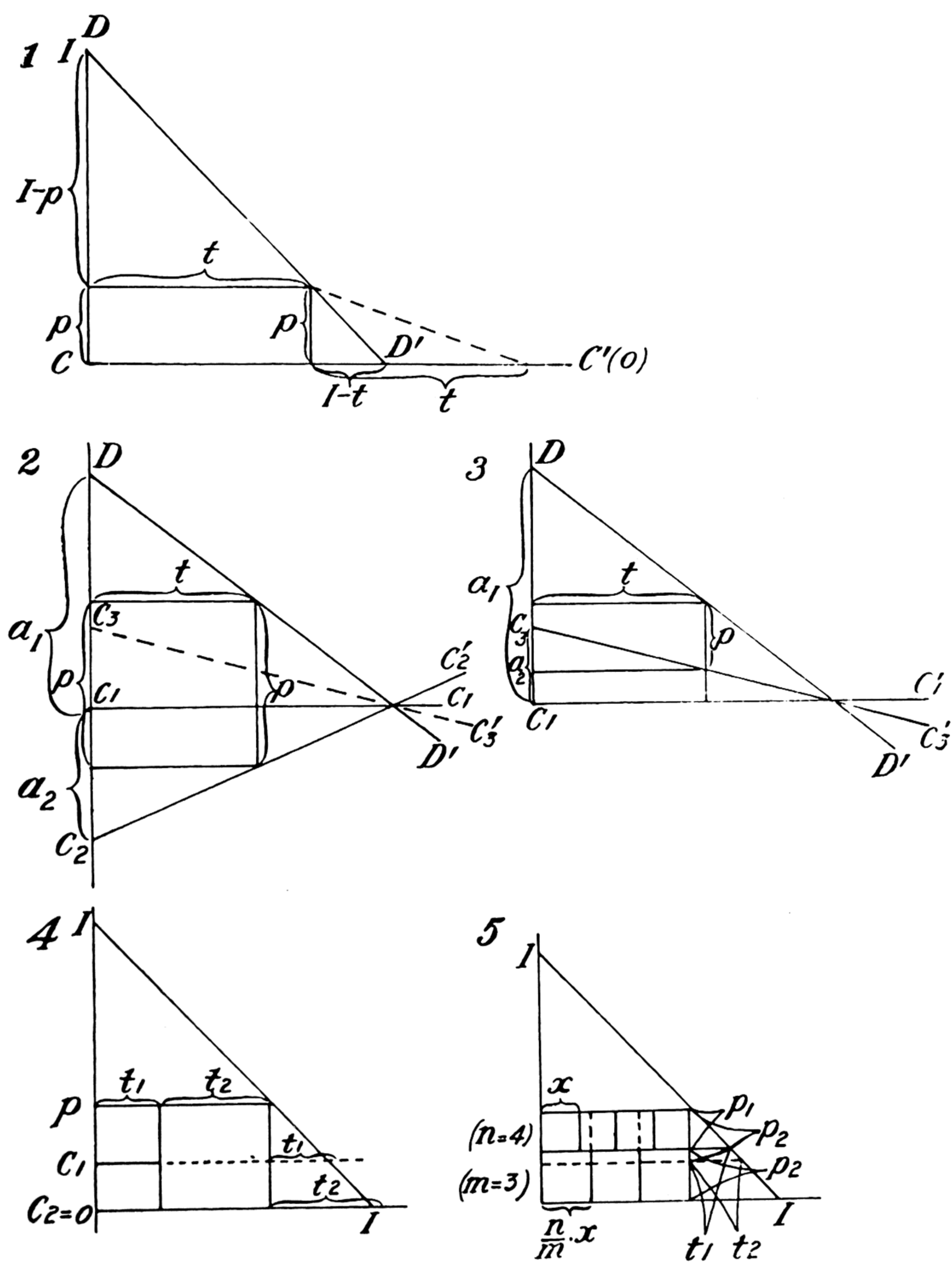


FIG. XXIII

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sudden reductions of the price to 0 ; $t : p$ indicates the sum of the power of extension, Σu , of the enterprises. We shall, consequently, by dividing p into the above formula, obtain the following equations :

$$p = \frac{1}{\Sigma u + 1} = \frac{1}{u_1 + u_2 + u_3 + \dots + 1} = \frac{1}{nu' + 1}$$

where the n of the latter quantity stands for the number of enterprises and u' for the average power of extension.

When, according to Cournot's assumptions, each of the n enterprises has a power of extension corresponding to the unsatisfied consumption, we find that $u = (1 - t) : p = 1$ (which means that each separate extension here follows the common demand curve), that Σu is equal to the number of competing enterprises, and that the price is $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, etc., when the number is increasing in the progression 1, 2, 3, etc.

It follows that $p = \frac{1}{n + 1}$. In the case of combination or common price policy Σu is equal to 1, which gives a price of $\frac{1}{2}$.

If one of the enterprises can extend business indefinitely at a small reduction of the price, the excess price will be 0. If, moreover, one enterprise extends business very strongly, at a very small reduction of the price, the excess price will practically disappear. A price equal to costs can only be obtained with an almost unlimited power of extension in one or several enterprises, or if there is a very large number of the latter. As is seen from the first formulæ, a proportionate change in the number of enterprises and in their average power of extension has quite similar effects.

If we do not have the simple case of a straight demand curve or a power of extension for the individual enterprises

corresponding to such a demand or moving proportionately thereto, u will vary with the price. In that case we have for each enterprise a formula indicating the sales, and if we divide it by the excess price, we obtain a corresponding equation, in which the power of extension is a function of the price, the sales of the enterprise itself and those of the other enterprises, $t_1 = f(p, t_2, t_3, \dots)$ (i.e., the demand equation of the individual enterprise), and consequently,

$$\frac{t_1}{p} = u_1 = f'(p, t_2, t_3, \dots)$$

The formulæ for p stated above also apply to the cases dealt with here, which means that we substitute the straight demand and extension curves by tangents to the respective curves at the point of equilibrium between price and sales. The conditions necessary for finding the individual as well as the total sales of the enterprises are present, since the formula for p mentioned before and the above equations for the sales or power of extension of the individual enterprises correspond to the number of unknown quantities.

Increasing or decreasing average costs in an enterprise cause partly a difference in the actual cost level at different sales, partly a marginal variation in the excess price, and consequently a marginal effect with regard to power or willingness of extension, entirely corresponding to the difference in the ability of the individual sellers to attract customers. From Fig. XXIII, 2 it is evident that the decisive power of extension at the point of equilibrium is $\Sigma u = ta_1 : (a_1 + a_2)$. If costs decrease as in Fig. XXIII, 3 the corresponding quantity is $\Sigma u = ta_1 : (a_1 - a_2)$, cf. the analogous case in Fig. II, page 8 (Σu being proportionate with the slope of DD' and CC').

BILATERAL MONOPOLY

Fig. XXIII, 4 illustrates a case in which two enterprises have different constant average costs. If the costs are not constant, the two lines c_1 and c_2 indicate the average costs at the point of equilibrium, and in this place, consequently, the slope of the curves will react on the power of extension of the enterprises, u_1 and u_2 . From $p+t=p+t_1+t_2=1$, and from the given conditions of extension, $u_1=\frac{t_1}{p-c_1}$ and

$$u_2=\frac{t_2}{p}, \text{ we find that } p = \frac{1+u_1c_1}{1+u_1+u_2} = \frac{1}{1+u_1+u_2} + \frac{u_1c_1}{1+u_1+u_2}$$

As c_1 is larger than c_2 (which has been fixed at 0), the price is increased by a quantity that is determined by the product of the excess costs of the dearer enterprise and what might be termed its relative power of extension. If we have a series of enterprises with different average costs at the point of equilibrium, and if we suppose No. 1 to be the cheapest producer, and c_2, c_3 , etc. to indicate the excess costs of the others, we shall have the general formula (c_1 being 0) for competing monopolies

$$p = \frac{1+u_2c_2+u_3c_3 \dots}{1+u_1+u_2+u_3 \dots} = \frac{1+\sum uc}{1+\sum u}$$

In the figure the following numerical values have been assumed: $c_1=\frac{1}{6}$, $u_1=1.2$, $u_2=1.1$, from which we have deduced: $p=4:11$, $t=7:11$, $t_1=2.6:11$ and $t_2=4.4:11$.

We shall now pass on to those cases in which one or several enterprises acting as buyers are faced with one or several sellers, and we shall begin by assuming each enterprise to have a power of extension corresponding to Cournot's assumptions, i.e., 1 in proportion to a constantly decreasing demand curve. In Fig. XXIII, 5, the upper layer of which

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contains n and the lower m enterprises, the total price is found in the following way :

$$I - p_1 - p_2 = I - p = n x \quad (1)$$

$$I - p_2 = n x + x \quad (2)$$

$$I - p_1 = n x + \frac{n}{m} x \quad (3)$$

By adding (2) and (3) and next substituting x from (1) we find :

$$p = \frac{\frac{I}{n} + \frac{I}{m}}{I + \frac{I}{n} + \frac{I}{m}} = \frac{n + m}{nm + n + m}$$

If there is only a single layer of competing enterprises (Σu here according to Cournot's assumptions $= n$), we obtain once more the formula mentioned above in page 79 :

$$p = \frac{I}{n + I} = \frac{I}{\Sigma u + I}$$

If the power of extension of the enterprises does not follow Cournot, we may for the numbers of n and m substitute the sum of the factors of extension of the individual enterprises in the separate layers, $\Sigma u'$, $\Sigma u''$, etc. ; each layer only influences the price (and thereby the sales) through the sum of the factors of extension, irrespective of the distribution of the latter among the individual enterprises. We then obtain the following general formula :

$$p = \frac{\frac{I}{\Sigma u'} + \frac{I}{\Sigma u''} + \dots}{I + \frac{I}{\Sigma u'} + \frac{I}{\Sigma u''} + \dots}$$

or if we have r similar layers, each consisting of n similar enterprises :

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$$p = \frac{r}{nu + r}$$

If the number of layers is 1, we return to a formula corresponding to that mentioned in page 79. In the specific case in which the number of layers and the number of enterprises in each are equal, and all enterprises correspond to Cournot's assumptions, the price will be $\frac{1}{2}$. When the average of u is essentially larger than 1, and the number of layers is small in proportion to the number of enterprises in the market, the excess price will be very small. This tendency is strengthened by the fact that u may normally be supposed to increase with the number of enterprises.

In the table below, in which a straight demand curve and common constant costs are assumed, we have set forth a series of numerical examples indicating the excess price and its distribution among the separate layers, as well as the total sales. In each line we have first indicated the number of competing enterprises in a single layer, or if there are more than one, the number of enterprises in each separately. In the two following columns, price and sales have been stated, when the individual enterprises act according to Cournot; in the last two columns we have similarly assumed a power of extension for each enterprise corresponding to the unsatisfied demand plus half that quantity multiplied by the number of competitors. (When there are 1, 2, 3, 4 . . . 10 enterprises, u will consequently be 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$. . . $5\frac{1}{2}$, and Σu 1, 3, 6, 10 . . . 55.) Actually, the power of extension of the enterprises is rather to be found between the two scales indicated, the latter of which is simple, arbitrary, and, if anything, exaggerates the increasing

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fall in prices in case of an increasing number of undertakings.¹

When considering the prices of the table, it must be borne in mind that a demand falling with decreasing rapidity (as is usually the case) will result in the price not approaching so far towards the top of the curve. A price-fight with the aim of destroying competitors or securing to oneself a greater share of the future market, also causes a further reduction of the price. The average of the total overhead and variable costs forms no decisive minimum for this fall. On the other hand, combination or mutual understanding raise the price to a higher level than that indicated by the table.

When several layers, each consisting of a limited number of enterprises, oppose one another, the total excess price is

¹ In the general formula for the power of extension for one out of a number of uniform enterprises, $u = b + a(1-p)\frac{n-1}{n}$, the ability of extension towards new customers, b , cannot exceed 1 (Cournot), while the power of extension to the customers of the competitors, a , may be both larger and smaller than 1 (1 being the decline of the common demand curve). We may for instance, assume b to be 1, and $a \frac{1}{2}$. As at the same time $u = (1-p) : np$, it is possible to find n when p is given and inverse. We obtain $n=1$ and $p=\frac{1}{2}$; $n=2$ and $p=\text{about } 0.3$; $n=3$ and $p=\text{about } 0.2$. It is, however, easier to find n from p since in that case the equation is of the first degree. (A second theoretical solution with regard to price seems to be altogether inapplicable.) Thus, corresponding to $p=1:10$, we obtain $n=\text{a little more than } 6$, and corresponding to $p=1:1000$, n equal to a little more than 666. When the number of enterprises is so great that the sales of the individual enterprises are not of essential importance, n is approximately two thirds of what it would be according to Cournot, and the same holds good of the price. The formula $n = (2-p-p^2) : (3p-p^2)$ approximately corresponds to $2:3p$, while according to Cournot the corresponding formula approaches $1:p$. If we do not assume the above special values of a and b , we find correspondingly, that when we have a great many enterprises, number and price do not, as according to Cournot, vary almost inversely, $p = 1:(n+1)$, but in the proportion $p = 1: [(a+b)n+1]$. This consequently means that *the sum of the two co-efficients of extension is decisive*, or that n in Cournot's result must be multiplied by a factor varying from $1:n$ to ∞ . If there are only few enterprises, the extension due to conquest of new customers counts most, and in that case the result will not be so different from that of Cournot. The second example of the table results in a strongly decreasing fall of prices when the number of competitors is increased; p is here equal to $1:(1+n+\frac{1}{2}n^2)$.

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Number of Enterprises.	Power of Extension of Individual Enterprises.			
	1 (Cournot)		1 + Half the Number of Competitors.	
	Price.	Sales.	Price.	Sales.
1	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
2	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{3}{4}$
3	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{7}$	$\frac{6}{7}$
4	$\frac{1}{5}$	$\frac{4}{5}$	$\frac{1}{11}$	$\frac{10}{11}$
10	$\frac{1}{11}$	$\frac{10}{11}$	$\frac{1}{56}$	$\frac{55}{56}$
1+1	$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$	$\frac{1}{3}$
2+1	$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$	$\frac{2}{5}$	$\frac{1}{7} + \frac{3}{7} = \frac{4}{7}$	$\frac{3}{7}$
2+2	$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{5} + \frac{1}{5} = \frac{2}{5}$	$\frac{3}{5}$
1+3	$\frac{3}{7} + \frac{1}{7} = \frac{4}{7}$	$\frac{3}{7}$	$\frac{6}{13} + \frac{1}{13} = \frac{7}{13}$	$\frac{6}{13}$
2+3	$\frac{3}{11} + \frac{2}{11} = \frac{5}{11}$	$\frac{6}{11}$	$\frac{2}{9} + \frac{1}{9} = \frac{1}{3}$	$\frac{2}{3}$
2+4	$\frac{2}{7} + \frac{1}{7} = \frac{3}{7}$	$\frac{4}{7}$	$\frac{10}{43} + \frac{3}{43} = \frac{13}{43}$	$\frac{30}{43}$
3+3	$\frac{3}{10} + \frac{3}{10} = \frac{3}{5}$	$\frac{2}{5}$	$\frac{1}{8} + \frac{1}{8} = \frac{1}{4}$	$\frac{3}{4}$
3+4	$\frac{4}{19} + \frac{3}{19} = \frac{7}{19}$	$\frac{12}{19}$	$\frac{5}{38} + \frac{3}{38} = \frac{1}{9}$	$\frac{15}{9}$
1+10	$\frac{10}{21} + \frac{1}{21} = \frac{11}{21}$	$\frac{10}{21}$	$\frac{55}{111} + \frac{1}{111} = \frac{56}{111}$	$\frac{55}{111}$
10+10	$\frac{1}{12} + \frac{1}{12} = \frac{1}{6}$	$\frac{5}{6}$	$\frac{1}{57} + \frac{1}{57} = \frac{2}{57}$	$\frac{55}{57}$
1+1+1	$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$	$\frac{1}{4}$
2+2+2	$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{3}{5}$	$\frac{2}{5}$	$\frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{1}{2}$	$\frac{1}{2}$
3+3+3	$\frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{1}{3}$	$\frac{2}{3}$
1+1+1+1	$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{4}{5}$	$\frac{1}{5}$	$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{4}{5}$	$\frac{1}{5}$

divided in inverse proportion to the number of enterprises within each layer, if all, as in the first section of the table, have the same power of extension. (First x is found from

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the formulæ belonging to Fig. XXIII, 5, and next p_1 and p_2 .) In section 2 of the table we have the greatest power of extension for each enterprise in the layer containing the greatest number of units, and the excess price is here, in conformance with the more general rule, divided in proportion to the sum of the power of extension of the enterprises within the separate layers. If the enterprises within the same layer have different powers of extension, we shall obtain the same result. The layers react upon each other through the price-determining sum of all powers of extension.

When equilibrium has been attained at a price above the average costs common to all enterprises, the sales within each layer are divided in proportion to the marginal power of extension of the enterprises (*cf.* Fig. XIV and the corresponding explanations). Increase or decrease in costs, it will be remembered, enter into the power of extension. If the enterprises have different costs, we obtain a relative increase in the sales of the cheaper enterprise, determined by the difference in costs and the respective powers of extension (*cf.* t_1 and t_2 in the formulæ belonging to Fig. XXIII, 4).

The formulæ which we have set forth above ought to be further worked out in order to get a better approximation to real life. It must be taken into consideration that, for one thing, trades are not divided in uniform layers, in so far as there exist enterprises which comprise all stages in the manufacture of an article from the mine to the finished product, and others that comprise only a single link of the process. Nor is the market a closed unit comprising a definite group of buyers and sellers, but a chain of connections between individual enterprises, locally as well as technically.

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We have already assumed that all enterprises need not have the same access to the common demand. Actually, the common demand curve ought to be resolved into mutually connected demand curves for the separate enterprises (*cf.* the comments on Hotelling's case, page 34, and the formulæ for t_1 , etc., page 80). Moreover, the dynamic nature of demand must be borne in mind (*cf.* the remarks on Fig. XIV, 12).

With a certain modification, each enterprise holds the position of a monopolist ; it is faced with a demand limited by the competition of other enterprises, which are situated at greater or shorter distances, locally and technically. Through its own determination of prices, however, it exercises itself a certain influence on this demand which, consequently, is no absolutely independent quantity, the paradox of Chapter II. The actual entrepreneur, therefore, is somewhat differently situated from the non-existing absolute monopolist.

Similar elastic relations exist between the entrepreneurs on one hand and their buyers and sellers on the other. The profit of one party is the cost of the other. As will be evident from Figures XXIII, 4 and XVIII A above, equilibrium is possible between enterprises which have not only different average costs, but also different marginal costs. (The same is evident from Fig. XVIII B—D when from the average costs indicated in the figure we deduce the marginal costs.)

Increase in the number of layers, *ceteris paribus*, raises the price, but not proportionately. In many cases, however, there is no increase, as a consequence of the simultaneous widening of the market, which, besides technical specialisation, for instance in the wholesale trade, may involve an increase in the number of competitors.

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When in the present treatise we reckon with definite monopoly profits in excess of costs, it is not a question of discernible quantities. The enterprise or entrepreneur has a comprehensive income, and the recognition of what is monopoly profit is only obtained by deducting hypothetically calculated costs from the total income. These imaginary costs under a supposed free competition correspond to competition between an unlimited number of enterprises which, however, work under actually existing conditions as to distance and relative supply in the market. At a real increase in the number of competitors, the reduction would in many instances disappear, owing to an inferior technique. Monopoly profit is not a special category of income, but an increase in the ordinary categories, appearing whenever competition is limited.

The division of the market involves a dissimilarity in prices and income whereby the single or few individuals who are opposed to many, obtain an advantage, and vice versa, owing to the circumstance that the thickness of the layers, i.e., the excess price obtained, is inversely proportionate with the number of units multiplied by their average power of extension.

The economic adaptation does not involve an equilibrium similar to that of liquids, which form large and absolutely even surfaces. In many spheres it is more like an adaptation of uneven and heterogeneous layers, consisting of large or small elastic solid bodies. The individual enterprises each react in accordance with their special personal, technical and mercantile conditions, and are, therefore, exposed to a highly varying economic pressure. This means that their incomes are more or less in the nature of profit.

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Their number as well as the extent of each cannot be altered without resistance on the part of those concerned, and an alteration is generally dependent on technique and market conditions. The fluidity and mobility of capital and labour, therefore, cannot in themselves counterbalance the influence of the greater economic units, i.e., the effects of the structure, coherence and stability of the individual enterprises.

5. DIFFERENT TYPES OF BILATERAL MONOPOLY.

The formal relationship between the parties is certainly of considerable importance in real life. The bilateral monopoly may, as hitherto assumed, concern two entrepreneurs supplying raw-materials or services who are both sellers to a third, non-monopolistic, party (the case of joint demand). It may, on the other hand, concern two monopolistic enterprises standing face to face as buyer and seller. In the main, however, the determination of price is the same in both cases, *cf.* Fig. XXIV A in which the two enterprises are both suppliers to a group of non-monopolistic buyers, and Fig. XXIV B in which entrepreneur No. I buys the product of entrepreneur No. II.

In the first instance, the market price of the commodity or of the two materials together includes the costs ($C_1 + C_2 = C_{1+2}$) and monopoly profits of both parties. In the second instance the market price p_a is reduced by an amount $(p - p_a)$ equal to the costs $(p - p_e)$ determined by $C_1 C'_1$ and profits $(p_e - p_a)$ of the buyer, whereas the quantity sold and the monopoly profit remain the same. Much the same is true if the two enterprises agree to a common monopoly policy, *cf.* the stippled lines.

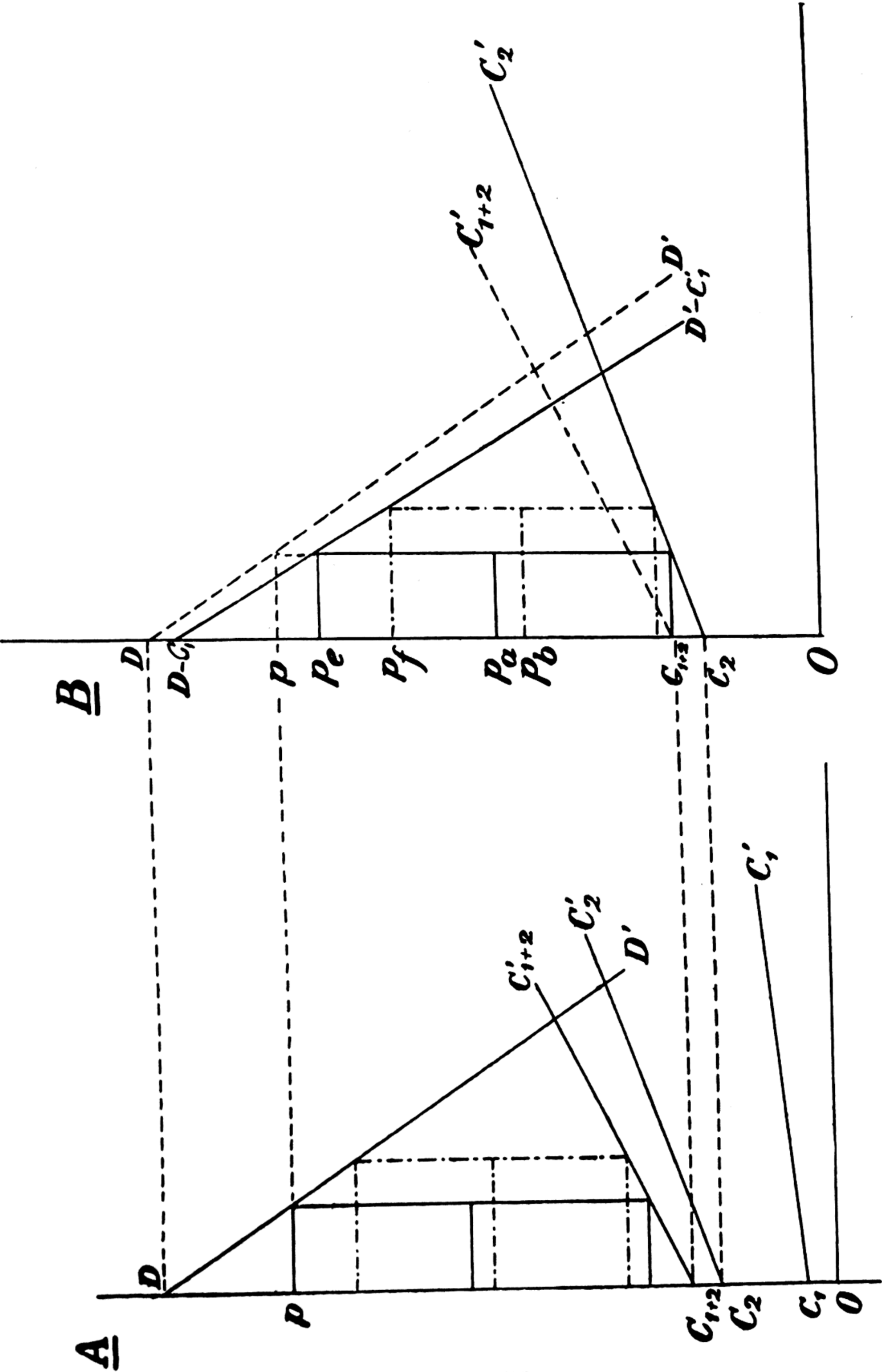


FIG. XXIV

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Fig. XXIV B is an illustration in the form of a graph of a market with a cost curve $C_2C'_2$ for a monopolist unable to discriminate, and a demand curve, which correspondingly, is the original demand curve reduced by the average costs of the buyer. We certainly have a definite solution in this instance when the parties act in agreement and jointly take the greatest possible profit. Once they have agreed to the price p_b not having come to any other arrangement, the party with the steepest curve, in this case the buyer, will find it most advantageous to raise his charge to the consumers above p_f ; thus the quantity sold is reduced, and the greatest possible profit is not obtained. If they were unable to agree also as to the amount to be sold or as to the retail price, the equilibrium will only be found at the mutual price p_a , and a corresponding retail price p . The direct negotiations between the parties in this case both as to price and sales make stoppage or agreement more possible.

6. THE SOLUTION BY MEANS OF VARIATIONS IN THE VOLUME OF TRADE

We have hitherto been able to obtain a definite equilibrium because an increase in the excess price of one party would reduce the quantity sold, which again, in its turn, would impair the sales, and thereby the profits of the first enterprise. The volume of trade, however, may not, owing to the shapes of the demand and cost curves, vary to any considerable extent. Trade may be at a point at which a great reduction of the excess price could not essentially influence sales or, on the other hand, a small increase in supply lead to a very large reduction of price.

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In Fig. XXV A, we have a straight demand curve for a buying monopolist (i.e., the original demand curve minus his costs) and a straight supply curve for a monopolistic

A

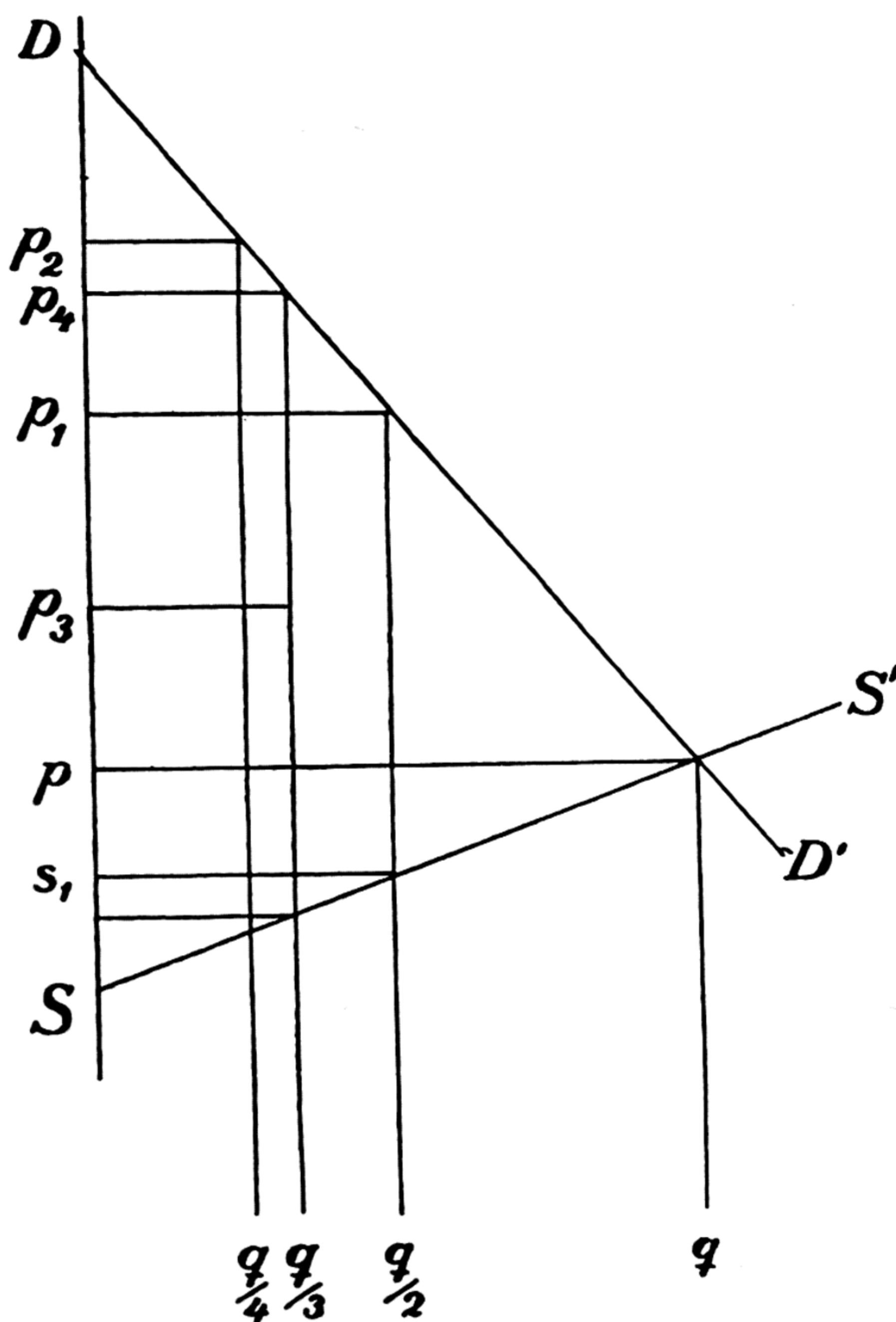


FIG. XXV A

seller, so that an adjustment between the parties can easily take place by means of variation in the volume of trade. If the seller to begin with sets a price of p_1 , for instance, which with unhindered sales would give him the greatest

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possible profit $(p_1 - s_1) \frac{q}{2}$, the buyer would reduce his purchases to $\frac{q}{4}$, which corresponds to a price for the consumers of p_2 . In accordance with Cournot, equilibrium is obtained when the price between the parties is p_3 , with a corresponding price for the consumers of p_4 and a quantity of $\frac{q}{3}$.

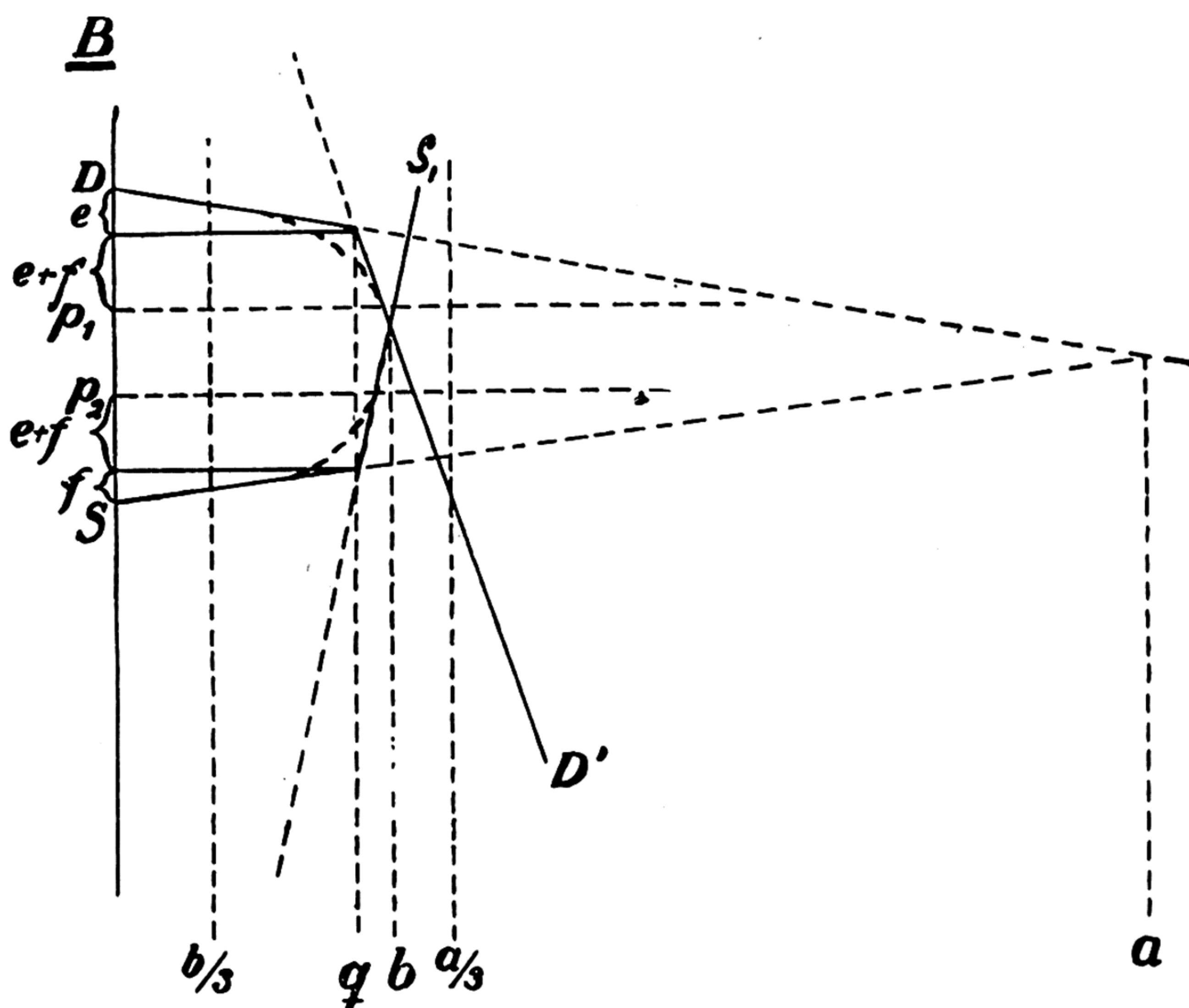


FIG. XXV B

However, such an equilibrium is not obtained in the simplified Fig. XXV B. If there were a single monopolist, the quantity sold would then be fixed at q , whilst the price, too, would be definite. If there were two opposing monopolists, the quantity sold would also be fixed at q , since the first, comparatively flat, strip of the curves tends towards a quantity $\frac{a}{3}$, i.e., a tendency towards an extension at least up

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to q ; the outer, steeper strips, on the other hand, tend towards a quantity $\frac{b}{3}$, i.e., a reduction of sales effective up to q . The two enterprises, in this case, will be unable to share the profits by means of a variation in the volume of trade. The seller may raise his price to p_1 before the buyer has any interest in reducing purchases, and the buyer may likewise reduce his demand to p_2 . In Fig. XXV C we have illustrated

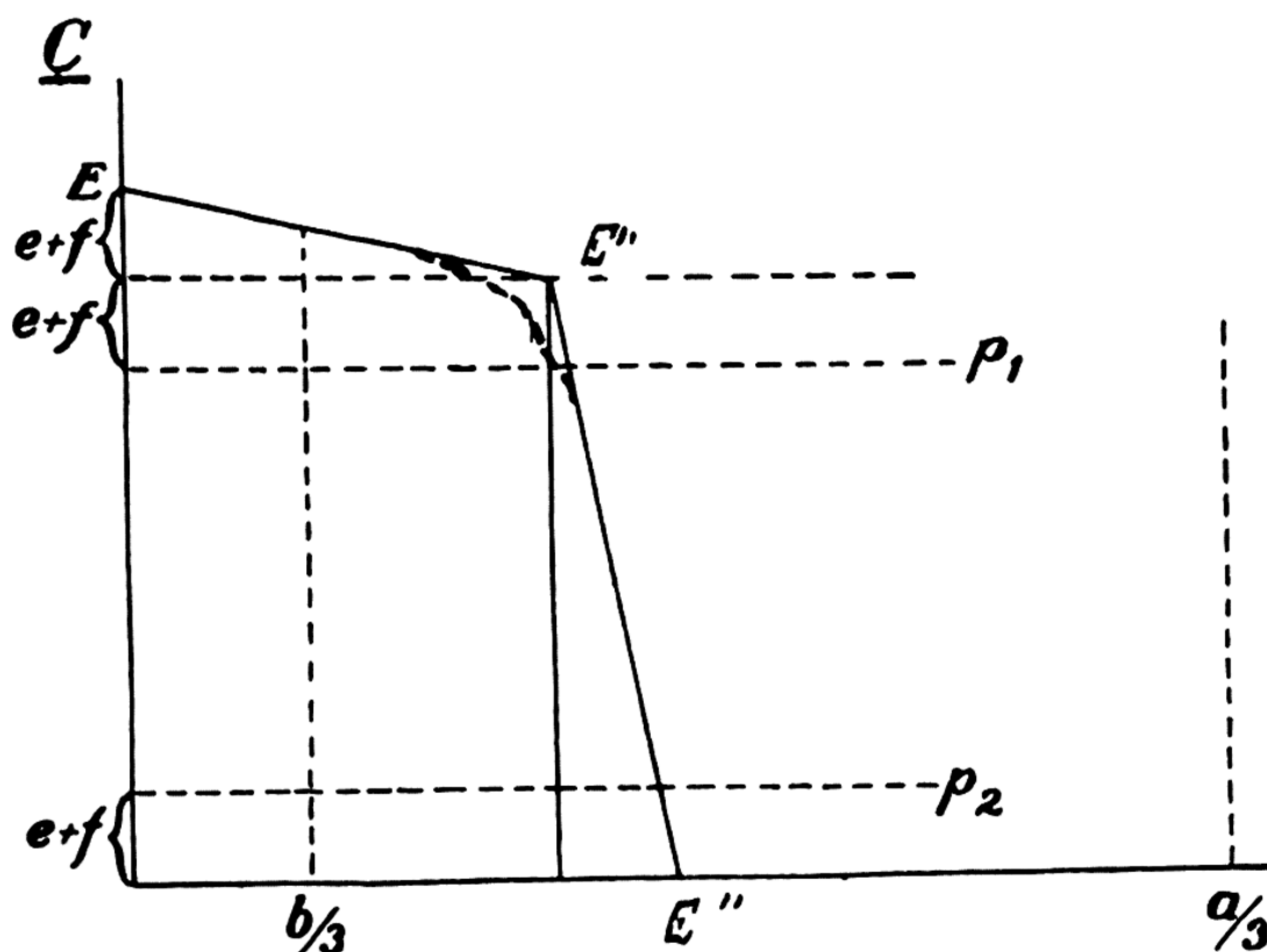


FIG. XXV C

the problem by means of a curve indicating the total excess price beyond total costs. (It is in all cases purely arbitrary that the two original curves should turn sharply at exactly the same quantities sold.)

As will be obvious from a study of figures B and C, the difference between the prices obtainable without any reduction of sales will be increased, the flatter the first strips of curves in proportion to the later and steeper parts. The margin containing no solution, appears when the sum of the

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rapidity of fall of the demand and supply curves increases in such a way that the inner strip points forward towards an equilibrium at a greater quantity sold, whilst the outer strips give a tendency towards equilibrium at smaller sales, i.e., in all cases when the excess price line declines with increasing rapidity about the possible point of equilibrium. Here no solution is possible by trying in the usual way to find the maximum profit for the two parties.

Presumably, in practice, the curves will seldom turn sharply, but have strips where the steepness of the excess price curve increases, *cf.* the dotted lines on Fig. XXV B and C. A certain adjustment may here take place by variations in the volume of trade (p_1 identical with p_2). However, one party will here reduce his sales slightly when the other party charges an amount giving greater profit, but in practice, the movement will certainly not always suffice to secure a peaceful settlement.

A continuous bend in the curve would give a theoretical possibility of a solution which, however, could not always be realised, since the parties, owing to their lack of knowledge of the actual conditions, and their defective technique of negotiation, would be unable to meet exactly at the point of equilibrium. Even if there were always a theoretical possibility of a peaceable settlement when the excess price curve has not a sharp turning, but the form of the dotted lines in the figure, the slight effect of changes in price on the volume of trade will nevertheless often make stoppage more advantageous to one of the parties.

Cournot, too, realises (§58) that certain demand curves which ascend according to an increasing gradient result in indeterminate prices; but "these peculiarities . . .

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE cannot have any application to actual events." "It is very plain that in the order of actual facts, and where all the conditions of an economic system are accounted for, there is no article of which the price is not completely determined." He does not explain, however, how this determination is obtained. In the latter part of the present chapter we are going to indicate some reasons why these peculiar cases must be supposed to be rather frequent in practice, and in the next chapter we shall point at a possible solution.

7. THE PARTIES BOUND UP WITH THE TRADE

Beforehand, it might perhaps seem that the situations depicted in Fig. XXV B and C are improbable in actual life. The demand of consumers must generally be supposed to decline according to a decreasing gradient. It is only in cases in which an absolute scarcity of raw-materials, etc., makes itself felt in the long run, that average costs may show a sudden steep upgrade when sales exceed a certain amount.

Long run conditions, however, are not the decisive factor on the actual market. At each given moment there are certain enterprises, groups of skilled workers, etc., and an immediate extension or one in the course of a few months is either absolutely impossible or made only at the expense of greatly increasing costs. A number of enterprises, workers, etc. normally corresponding to the amount previously sold, will be bound to the trade, only requiring payment for comparatively limited current costs and repairs; but a sudden extension of supply beyond the previous amounts would be very expensive. Any extension up to full capacity

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may take place against payment of comparatively small current costs, but if a further extension were demanded, costs would rise suddenly and violently.

The conventional character of the consumption and its dependence on contracts and stipulations, etc., may for short periods give the demand curve a strong decline round the usual quantity sold.

8. DEFECTION OF ORGANISATION

Another circumstance which in many instances causes the curves indicating the proportion between price and sales to begin horizontally and to finish steeply, is that there is lack of concord within the organisations of employers and workers, for instance, when the excess price is so far increased that the amount sold is considerably reduced, whilst there is no defection of organisation in case of a limited reduction. Fig. XXVI illustrates this circumstance in the case of a trade union, DD_1D_2D' being the demand curve of the employers for organised or unorganised labour. Under a very high wage employers will demand scarcely any labour, i.e., D in the curve DD' , and almost all of the workers will be willing to offer their services outside the trade union. Here the Blackleg supply is B ; when the volume of employment reaches a certain extent, the bulk of the workers will not try to get work outside the trade unions, and the Blackleg supply curve will, as a result, between B_1 and B_2 , rapidly approach the y-axis. Few workers only will seek employment outside the union when the latter can provide almost all that is wanted. The demand curve of the employers' association for trade union labour, TT' , which is decisive in

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the part of the market directly concerning the relations between the two organisations, is now determined for each quantity sold by deducting the Blackleg supply, i.e., the original employer's demand curve DD' minus the distance between BB' and the y-axis. The result is that the degree of concord within the organisation which is smaller at the low than at the high rate of employment, makes the schedule

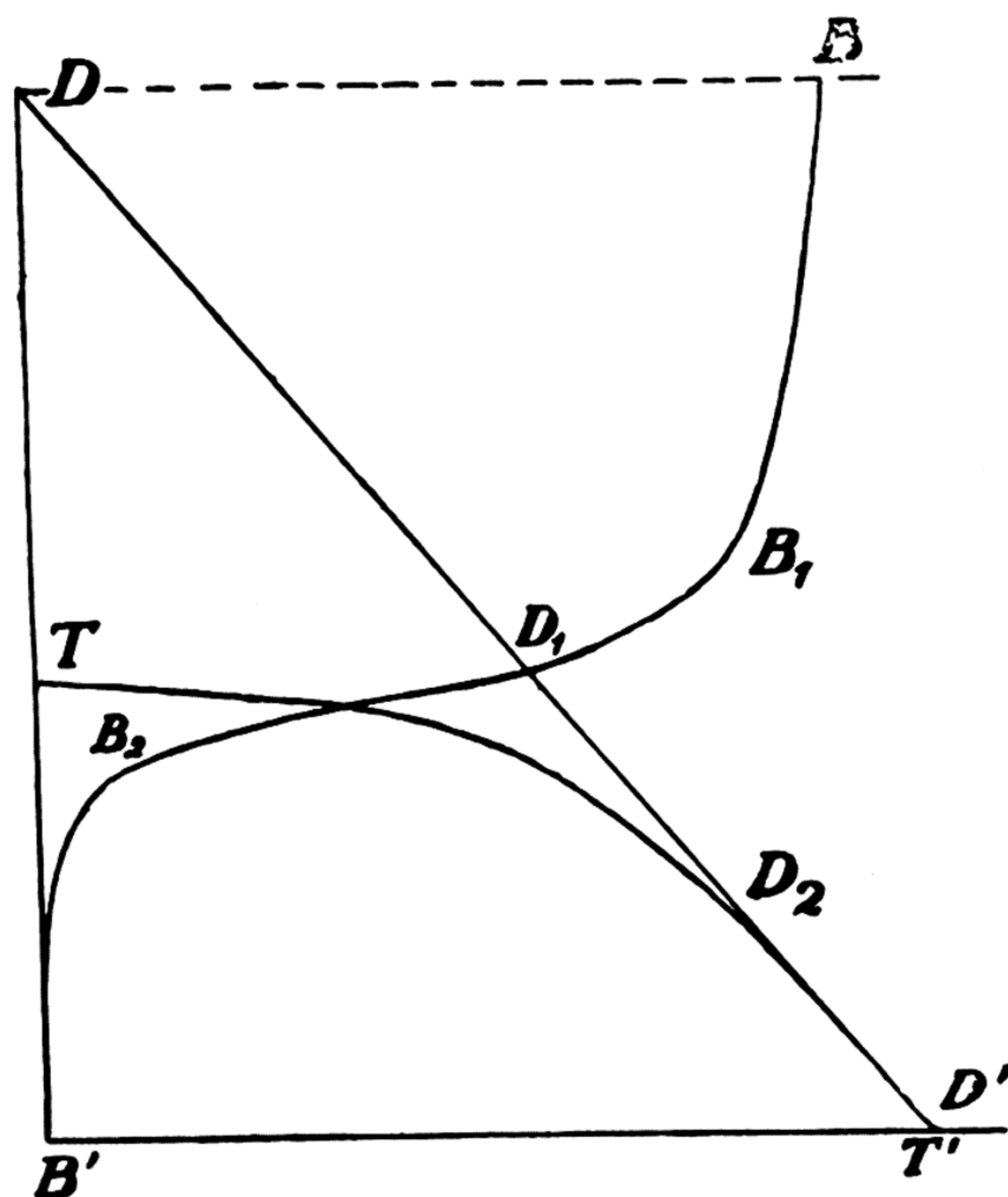


FIG. XXVI

of demand for its services relatively flat at prices corresponding to a low degree of employment ; on the other hand the degree of concord makes the demand decline relatively steeply near the satiety limits. Consequently, the quantity offered by the organisations is relatively fixed for short periods, partly because an extension as well as a limitation of the trade is difficult, and partly because the organisations

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hold firmly together as long as there is no question of great changes in employment, falling to pieces if the quantity is restricted to any considerable extent.

9. VARIATIONS IN TECHNICAL METHODS

A third, very essential circumstance which may work in the same direction, but which we shall not examine very closely, is the effect of new technical methods. Hitherto

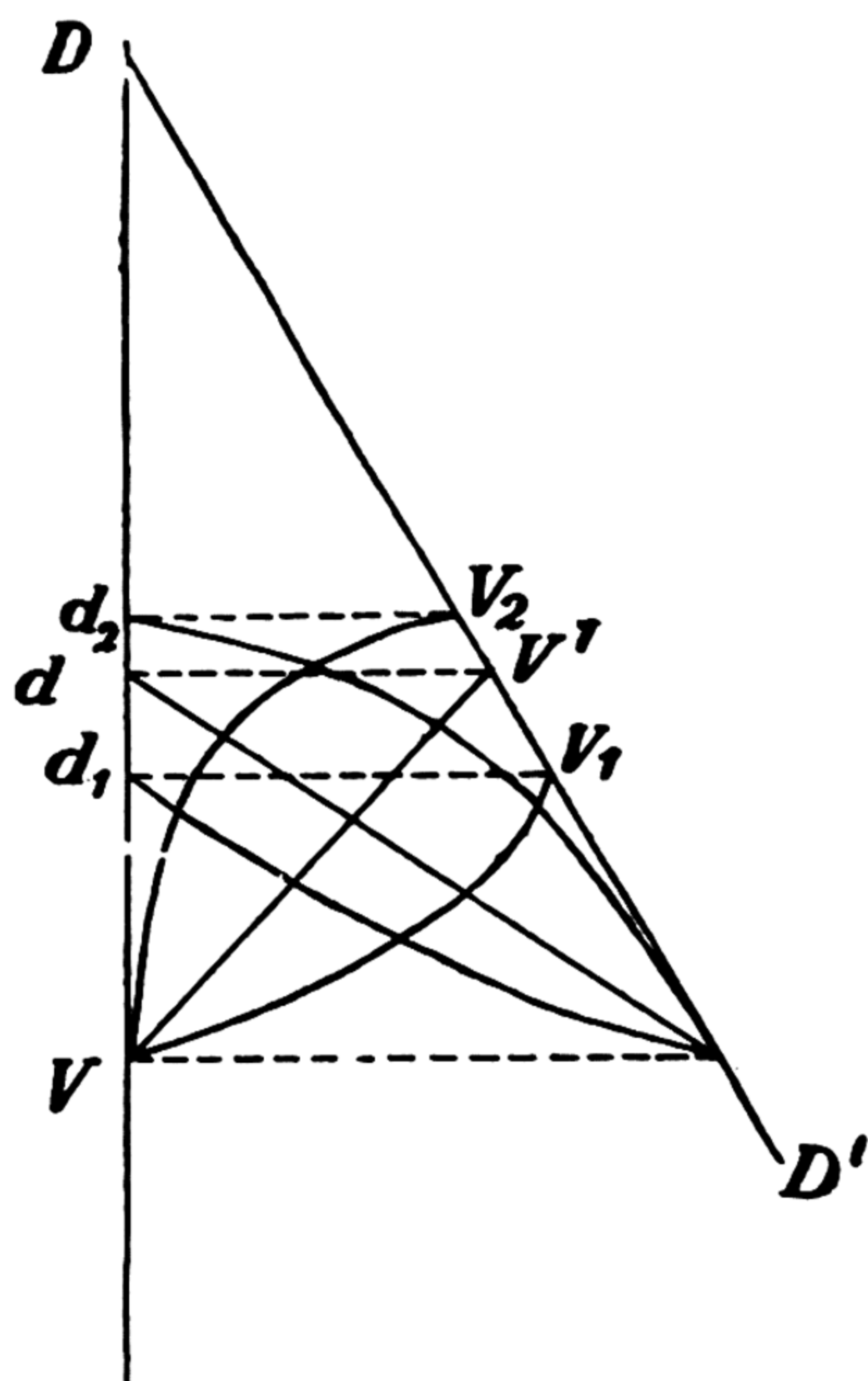


FIG. XXVII

we have dealt with those cases in which the two commodities or services worked together in a fixed proportion, but in reality, a rise in the price charged by one party will often be met by a change of technique ; an increase in wages, for instance, by a greater employment of expensive machinery. At the same time as the two parties supplement each other, they are within certain limits capable of substituting each

other. The higher the price set by the one, the greater the efforts of the other to do without it. This means a weakening of the demand of the latter party, which is most effective when the price is high, thus contributing to a flattening of the demand curve for the services of the former, *cf.* Fig. XXVII. Let us assume DD' to be the demand for labour when a certain technique is employed, VV' being the extent to which labour will be substituted by other means of production in the event of an increase in wages above the present rate; the curve dD' will then represent the reduced demand for labour at higher rates. This circumstance causes a certain flattening of the demand curves, but its further effects on their shapes needs more investigation.

In the long run it is most likely that a larger increase in the rate of wages will involve a less than proportionate saving of labour (V_1), and that the result therefore will be the reduced labour demand curve d_1D' . It is also possible, however, that transition to a labour-saving technique will in many instances only be occasioned by wage increases of a certain minimum amount, and that it will assert itself increasingly according as the wage is raised (V_2). It follows in this case that the element in question, just like the two dealt with in the preceding paragraphs, will cause the actual demand curve (d_2D') to fall with increasing rapidity round the previous quantity sold, and consequently, counteract an adjustment through changes in the volume of trade.

10. COMPLETE TEMPORARY STOPPAGE

It is obvious from § 6 that the demand and average cost curves, or the joint expression of both, viz., the excess price curve, may be of such shapes that no adjustment is possible

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between two opposing monopolists through an arrangement of price and sales, the quantity sold being relatively fixed. Here one enterprise may increase its price without making the other interested in any essential reduction of sales thereby. As was described in §§ 7-9, there are reasons in favour of the conception that the case occurs as a consequence of three alternatives. Firstly, because of a sudden, strong, temporary increase in the necessary costs when production is at its maximum, and possibly a temporary decrease in demand if production exceeds the customary quantity. Secondly because the groups of factors hold more firmly together when employment is brisk, or thirdly because in some cases perhaps, technical substitution by other means of production does not take place until the price passes a certain limit. Whatever the reasons may be, in real life we often come across cases where means other than a variation in the volume of trade seems necessary to distribute the profit between two opposing monopolies, and where such means are employed, however.

The means in question are economic warfare, i.e., the complete temporary discontinuation of all connections with the other party or threats of such a discontinuation. The necessary condition for the effectiveness of this means is that the other party is bound to the trade for a certain future period. The cause of the failure of adjustment is not only the shape of the curves, even if this is highly contributive to the necessity of seeking another solution, but also the fact that life does not consist of a series of isolated moments. Consecutive dispositions and interests prevailing for longer periods of time, in connection with unequal waiting ability make compulsion possible. The efficiency of the means of

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warfare, and the sacrifices the people in question are willing to incur, depend even on the length of the possible period of agreement or the subsequent period of peace, the price conditions of which are determined by the issue of the war. The above-mentioned conditions for the occurrence of a state of warfare, especially the one that the parties are bound to the trade and are prepared for a certain volume of sales, indicate that the results of war are temporary.

Where the curve does not have the increasing decline mentioned above, there is a possibility of adjustment without fighting. If, during the subsequent brief period, the parties concerned only pay regard to that which gives the greatest profit, there will be no advantage to either in resorting to methods of warfare. There are cases, however, in which a stronger party, i.e., in this case the one that can best afford to wait for the resumption of business—almost irrespective of the shape of the curve—can force the other if it is bound to the trade, to accept a lower price than that corresponding to an adjustment by means of variations in the volume of trade. For a boycott to be effective it is necessary, besides having oneself a greater ability to wait, that the other party should not, with profit, be able to pass over to other markets.

In the above-mentioned cases, fighting takes the place of a free adjustment, but, as already stated, it is possible to increase the total monopoly profit by amalgamation or by common action. The conditions for the form of monopolistic adjustment which we examined at the beginning of this chapter may, therefore, easily be substituted by others, such as fighting or amalgamation, in which case the solution differs.

BILATERAL MONOPOLY

In the next chapter we shall consider the determination of prices by threats of complete stoppage in cases of two opposing monopolistic organisations ; as this problem is extremely complicated, we shall deal essentially with the pure, and most extreme case in which the volume of trade is absolutely fixed. In order to illustrate this problem more closely, we shall, moreover—contrary to the hitherto very abstract representation of the problem—examine the extremely important practical instance of a trade in which an all-comprehensive trade union is opposed by an all-comprehensive association of employers. In §5 of the chapter we shall, however, deal with those cases where the quantity sold is not absolutely fixed.

CHAPTER IV

ECONOMIC WARFARE

I. ON " INDETERMINATE " WAGE PROBLEMS

It is generally maintained in cases where organisations of employers and workers are opposed to each other, that it is possible to fix definite economic limits within which agreements may be obtained, but that the question as to at what point within these limits the settlement will be made, is indeterminate from an economic point of view. To many people it will seem that the efforts to find a more definite economic solution to this problem are hopeless and futile. At negotiations between employers' and workers' organisations, purely personal elements, the skill of the negotiators, misunderstandings, bluff, etc., undoubtedly play a considerable part. There is no need for us to describe in detail the whole of this recognised technique and psychology of negotiations, which is so important to the result. As mentioned at the end of the previous chapter, we shall deal mainly with the most extreme cases, in which both the employers and the workers of a trade are fully organised, and in which the possibility of variations in the volume of trade has no effect at all on the height of wage-rates, which is determined exclusively by fighting or by threats.

In a mathematical appendix to his book, *Methods of Industrial Peace*, Professor Pigou has tried to fix the limits

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of a more definite range within which the verdict of arbitration is tenable or, what amounts to the same thing, the rates about which it is possible to come to an agreement. Let us, with Professor Pigou, call it the *range of practicable bargains*.

The establishment of any rate within these limits—by agreement or by arbitration—will be more advantageous than a conflict to either party ; any rate outside these limits will be less advantageous than a conflict to one party, at the same time giving the other greater advantages than it would be possible for it to obtain within the limits.

The limits of the fighting sphere are determined by the expected result of a fight plus or minus the expected fighting costs. The workers will not be content with less than the result they expect to obtain through a fight, minus a reduction in the rate of wages, which means the same to them as the losses they expect the fight to involve ; correspondingly with regard to the employers. The parties may possibly each expect a different result from the fight. It is of greater interest, however, that they may make quite different estimates of the cost of fighting, so that the limits of the fighting sphere need not be sought at the same distance on either side of the expected result. If now, we have a market with an elastic demand (otherwise we do not pay any regard to elasticity to begin with), the extent of the sales at different rates of wages will exert a certain influence on the comparison of the parties between different rates, and thereby on the differences in wages which correspond to the fighting costs, and on the limits of the fighting sphere, *cf.* § 5.

So far, we can trace the measureable quantities that enter into the considerations of the parties, including the estimated

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

cost of conflict, but within the limits just discussed everything seems to be indefinite and economically indeterminate. If in a certain trade, for instance, wages fall below 63s., the employers' association will prefer any wage to conflict, and if they exceed 45s., the same will be true with regard to the trade union. It is within these limits that the wage problem is considered *indeterminate*, since in this case the settlement will depend on skill at negotiation, changing sentiments among the rank and file, accidental circumstances, bluff, etc.

2. DETERMINING FORCES

Doubtless these factors considerably influence the result but, nevertheless, the economic forces that are at work outside the *range* are—as will be seen—not quite suspended within. Every solution is not equally probable, and if you take a large number of cases, you may expect the economic forces to express themselves in a certain tendency. This means that the question is not economically indeterminate, and that the problem is not insoluble if, like in other economic problems, one is content with a solution that amounts to only a definite tendency, a determinant, which together with other determinants of quite a different and less invariable nature, brings about the result in the particular case.

If, really, an ultimatum were always binding for the party that delivered it, the essential thing, when isolating the individual case, would be the fact, who first put forth the greatest possible claim within the “indeterminate” range. Here, of course, it would always be to the interest of the opposite side to avoid the conflict, but this is not the case,

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even though a tactical advantage may be gained by binding oneself to a claim one would prefer not to fight on.

An ultimatum may be withdrawn, however ; if one has been delivered, and if neither of the parties are unconditionally in favour of a conflict, the main question will be, both for the party that has delivered the ultimatum and for its opponent, as to whether it should yield before the time of expiry or whether it should hope for the other party to do so. The more a claim does not harmonise with the actual conditions of power, the more vigorously will considerations of prestige and of fear of setting a dangerous example arise.

Even when, theoretically, there exists at least one possibility of peaceful settlement to the interest of both parties—when the lowest conceivable claim of the workers falls below the highest possible offer of the employers the negotiations are often of such a nature that a fight within the *range of practicable bargains* is the result. It is to the interest of the respective parties to simulate a readiness to fight greater than they actually possess, and in case they should fail in this purpose, really to be as ready for conflict as they wish the other party to imagine. Agitation among the common members is generally the main method, though unreliable in its effects. The mobile heads of the organisations try to the best of their ability to place their heavy and less dirigible sections in a position which is neither too bold nor too modest. The individual party may then, by its more or less obstinate attitude, to a greater or smaller extent run the risk of a fight.

After having thus recognised the great uncertainty actually prevailing, as to where the settlement will be made

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within the range of practicable bargains and that, in spite of the existence of a number of possibilities of peaceful settlement, a conflict may easily ensue, we shall try to ascertain whether there is not, after all, a tendency in the direction of agreement at a definite rate. If the parties are directed by a definite and rational policy based on objective economic conditions and the conditions of power, these circumstances will determine the result.

The first question is : what values and what quantities should be the determining factors for the parties ? The second : in what manner should the parties be guided by these quantities ? Taking actual negotiations concerning wage problems, we are certain that the parties are guided by facts that may be expressed in figures, but how the calculation is actually made, it is not easy to see. Normally, the decision will be the result of an estimate of all the conditions at hand, i.e., the real calculation is left to the subconscious and to one's instinct.

The quantities considered, are the rates of wages in various instances together with the loss, cost and unpleasantness of stoppage.

The higher the wage, the greater the sum of economic advantages for the workers during the period in which the agreement is in force, and the smaller the sum of advantages obtained by the employers. At any rate of wages that comes up for consideration, a comparison will take place between these expected values of settlement and the expected values of conflict at this very rate. In case of settlement, the expected values are, for the trade union, the value of the achieved rate multiplied by the number of employed workers, and for the employers, the value of the products less other

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costs, less wages. As will be evident from what follows, it is the difference between the expected advantages of settlement at different rates that is decisive for the action of the parties. The decisive factor will, consequently, be a difference between two rates or, if preferable, a corresponding difference per worker. The expected value of a conflict for either party will consist in a sum of the possible results of warfare, each of which is calculated according to its probability, less a corresponding sum for the possible costs of conflict.

If it is known with certainty, or if the parties think they know what will be the result of the fight, and how long it will last, the quantity is fairly simple, being the result of the fight less its costs. If there is any uncertainty with regard to the result of the fight, however, the expected value will become more complicated ; it will then, as mentioned, depend on a series of possible settlements, possible costs, as well as the respective probabilities. If there exists a legal minimum wage, it will raise the workers' expectations in the event of conflict and increase their demands accordingly, diminishing the fighting spirit of the employers. The opposite is the case with regard to the general conditions limiting the possible rates. How to determine in practice the expected value in case of settlement and conflict (A and B in the figure and the equations below), is a problem in itself ; see the points of view set forth in §§ 5 and 6. Here, we shall have to deal mainly with the second part of the question : how are the parties to proceed rationally, when they have certain conceptions as to the value of settlement and conflict in a given situation ? How are they to proceed when they are only able to estimate the difference between

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the expected value of settlement at two different rates and the difference in the expected value between a settlement and a conflict arising from the claim of the same rate, or when they are only able approximately to measure the proportion between two such differences ?

If a very low rate is at issue, the expected gain of the workers from a conflict will be greater than that from a settlement and, consequently, they will be unconditionally in favour of a conflict. At the lower limit of the range of possible bargains the two expectations are equal. If the rate were to rise further, the workers would prefer to avoid conflict, but if they openly told the employers so, they would expect, normally, not to get a farthing more. Surely they would be willing to risk something in order to raise the rate beyond the point at which a settlement was worth no more to them than a conflict, and they would sacrifice something if they could thereby further reduce the claim of the employers. The sacrifice—as we shall see—may be measured in terms of the *probability of conflict to which they are willing to expose themselves by maintaining an ultimatum*. It is in fairly good accordance with the actual facts to assert that it is this standard of measurement that determines whether the trade union puts forward a claim beyond the utmost limit of its willingness to take up an unavoidable conflict, in the hope that the opposite party may be afraid to fight and therefore be willing to yield. The question arises as to how much they will risk. Since, however, the employers are in quite a similar situation, and are willing to incur a certain risk in order thereby to obtain a further reduction of wages below their own utmost limit, have we not then come into a sphere of pure chance ?

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3. CALCULATION OF THE PROBABILITY

As the question is rather complicated, and since we must be very accurate in our statement thereof, we shall examine it, at first, in a somewhat simplified form.

We presuppose, for the present, that the parties only reckon with the actual expected values to them of settlement and conflict, disregarding the unpleasantness or maybe,

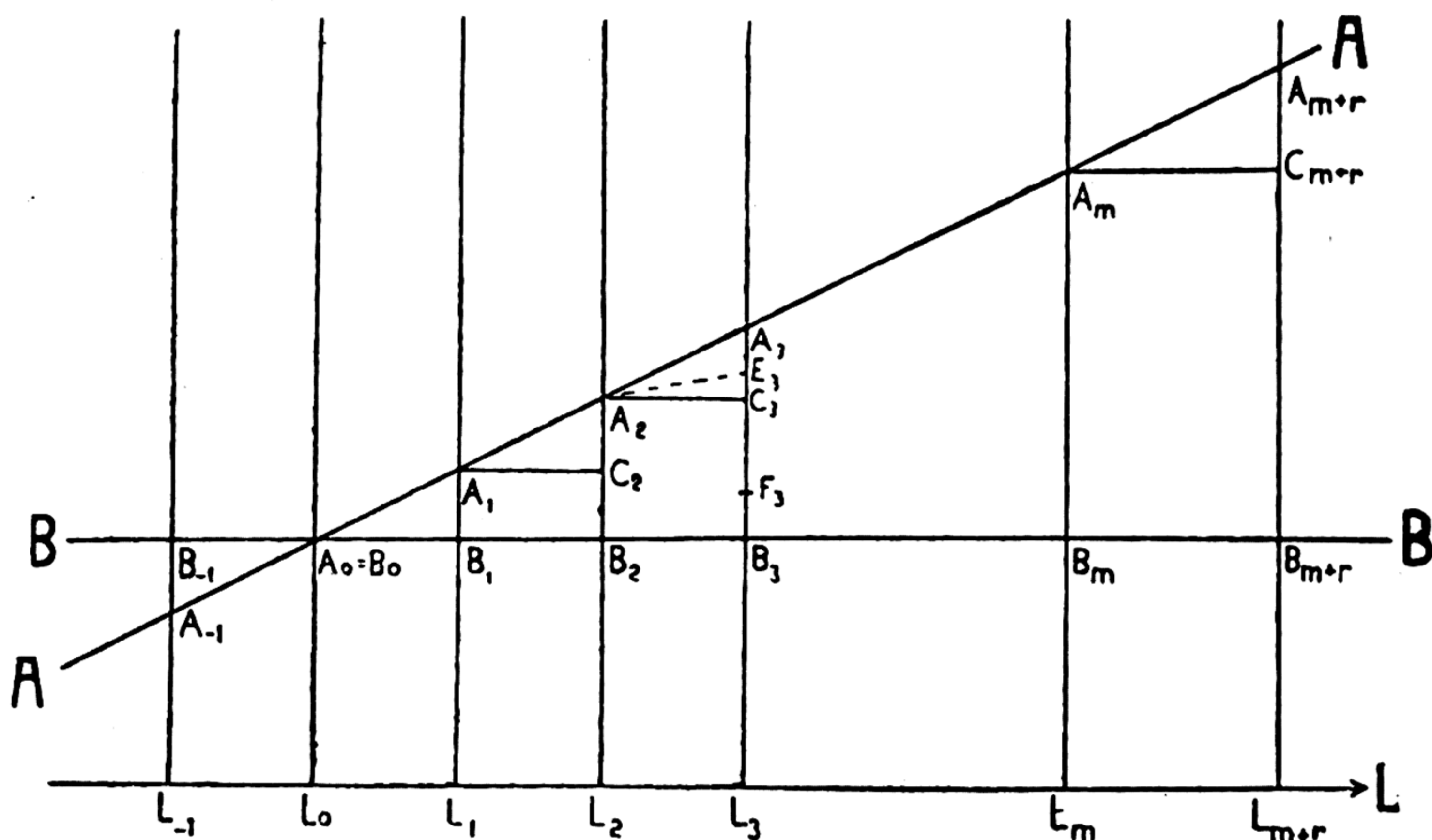


FIG. XXVIII

the attractiveness, of the element of uncertainty, i.e., the cost of risk-taking.

In the figure above (Fig. XXVIII), we have indicated the conditions on which the deliberations of the workers are based ; at each rate of wages (L) their expectation of a settlement at that rate is A , and in case of conflict— B . The expected value of settlement is, for the present, assumed to be proportional to the rise in the rate of wages whilst the expected value of conflict is assumed to be constant, i.e.,

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A—A and B—B are straight lines, B—B being horizontal. As we shall see in §§ 5 and 6, the suppositions are far from exact, and are in no way necessary for the achievement of our final result. We begin with a simplified case merely to give a clear outline of the essentials, i.e., increasing advantage to the workers the higher the rate, and the existence of certain expectations in case of conflict, reserving the more doubtful questions as to the proportion in which the expectation of the workers rises at higher rates, and how the expectations in case of conflict vary in relation to the height of the wage in dispute.

The minimum demand of the workers is, in Fig. XXVIII, at the rate L_0 , where $A_0=B_0$; in this instance it is just the same to them whether settlement or conflict is the result, whereas at the lower rates, $B>A$, they prefer conflict, and at the higher rates, $A>B$, they prefer settlement.

The trade union will only find it to its advantage to maintain a claim for L_1 (practically the smallest possible increase over their minimum claim L_0) provided that the expectation of the profit that may be obtained by claiming L_1 , L_0 being certain, is equal to the expectation of the loss that may be incurred thereby, i.e., $(A_1-B_1)(1-c_1)=(A_0-B_0)c_1$, where c_1 is the greatest probability of conflict to which they can advantageously expose themselves. As there is nothing to be lost through a conflict at the starting-point when $A_0=B_0$, c_1 will be equal to 1. It will then be most profitable to claim a wage which—practically speaking—lies just above their minimum demand, even if a conflict were then certain. This means that the range of practicable bargains is somewhat restricted by reckoning with intervals between the possibilities of negotiation.

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If the trade union, thinking that a settlement may be obtained at L_1 , nevertheless claims L_2 , the corresponding probability of conflict that they dare to risk at the utmost, will be found from the equation: $(A_2 - C_2)(1 - c_2) = (A_1 - B_1)c_2$. As we presupposed, $A - A$ is a straight line, and the rate-intervals of $(L_1 - L_0)$ and $(L_2 - L_1)$ are equal, c_2 thus being equal to $\frac{1}{2}$. Put into everyday language, this means that the leaders of the workers reasoned as follows: "The employers are willing to give 3s. a week beyond 45s. say, a rate which to us is no more advantageous than conflict. If we now demand a further 3s., i.e., 51s. a week, we may expect a profit of 3s. per worker, but also a loss of 3s. per worker as compared with the 48s. of which we may be sure if we submit no further claim. Consequently, we only forward the claim if we think it most likely that the employers will agree to it, i.e., we think that by demanding the 51s. we risk a probability of a conflict of 50 per cent. at the most". (If now, the increase from 45s. to 48s. has a greater utility to the workers than that from 48s. to 51s., they will not even risk a 50 per cent. probability, but only forward the claim for instance, if they think that the employers will reject it in but 1 case out of every 3, i.e., if the probability is $33\frac{1}{3}$ per cent. at the most. This modification we shall, however, leave for the present (see page 130).)

In the same way we can find the highest probability the trade union leaders are willing to risk by going one step further, when it is supposed that a settlement may be obtained at A_2 , A_3 and A_{n-1} respectively; it will, consequently, be $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{n}$. The latter will also hold good when it is a question of infinitely small intervals, the varying size of the intervals not being decisive.

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If it is certain that the employers will give a wage that is m above the minimum demanded by the workers, the latter will only find it advantageous to risk a probability of conflict corresponding to c in the following equation, by demanding a further increase of r (see the figure) :

$$\begin{aligned} c(A_m - B_m) &= (1 - c)(A_{m+r} - C_{m+r}) ; \\ c &= (A_{m+r} - C_{m+r}) : ((A_{m+r} - C_{m+r}) + (A_m - B_m)) \\ &= (A_{m+r} - C_{m+r}) : (A_{r+m} - B_{m+r}) \end{aligned}$$

This formula, which is true irrespective of the shape of the lines $A-A$ and $B-B$, in so far as the fluctuations of the latter are relatively unimportant, says that the probability is the difference between the expectations of settlement at the two rates at issue divided by the difference between the expectations of settlement and conflict at the more favourable rate. The probability is, in other words, the *increase in wages divided by the fighting costs*.

If it be now supposed, as we have done hitherto, that $A-A$ and $B-B$ are straight lines, and that B is constant, we shall find that the various fully drawn triangles in the figure are similar, and that consequently, if the dispute is about L_m or L_{m+r} , $c = r : (m+r)$. At each wage interval the probability is found to be the same as the *proportion of the length of the wage interval to the distance from the minimum demand to the wage desired*.

The series of probabilities which we have found in that way are only marginal values concerning a possible step forward from a point at which a settlement can be obtained. As was seen, the probabilities mentioned decrease in a rapidly declining progression—gradually as they advance beyond the utmost point for unconditional conflict. The absolute magnitude of the probabilities are dependent on the length

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of the intervals, and if there is a choice between demanding much or nothing, they will risk a greater probability of conflict than where it is only the question of a small step forward.

4. INTERPLAY BETWEEN THE TWO PARTIES

The calculation of how great a probability of conflict one party, the trade union for example, will find it to its account to expose itself to at different rates affords, however, only one basis of how to act to the greatest advantage. The other set of conditions applies to the conjecture of the same party as to how the other party, the employers' association, say, will act to its advantage on its own pre-suppositions. In order that the parties can form a basis for a decision as to whether they ought to maintain a certain claim, it is necessary to have quantities that may be balanced against one another with regard to their action in the same wage interval. We must here have quantities of an equal dimension for either party at each rate of wages, besides the rate itself. Neither the expected values in money nor in utility can be compared for the two parties, because a basis of recalculation is lacking. In addition, how one is getting on is of little importance to the other. The threat to fight the matter out is the only thing that counts—and the variable element is the probability of conflict which the opposite party dare risk.

Either party will continue to increase its claims so long as the utmost probability of conflict to which it can find its advantage to expose itself, is greater than the maximum probability which it thinks the other will risk, by opposing

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	Wage-interval, shillings.					
	45-48	48-51	51-54	54-57	57-60	60-63
A. (Intervals 3s.)						
Trade union's readiness to risk a fight (per cent.)	100	50	33½	25	20	16½
Employers' readiness to risk a fight (per cent.)	16½	20	25	33½	50	100
B. (Different Intervals)						
1. Situation	Employers' offer 45s.; Trade union's offer 66s. Employers' probability 100%; Trade union's probability 100%. Both interested in concessions.					
2. Situation	Employers' offer 45s.; Trade union's offer 60s. Employers' probability 83½%; Trade union's probability 100%. Employers have to yield.					
3. Situation	Employers' offer 51s.; Trade union's offer 60s. Employers' probability 75%; Trade union's probability 60%. Workers have to yield.					
4. Situation	Employers' offer 51s.; Trade union's offer 57s. Employers' probability 50%; Trade union's probability 50%. Both interested in concessions.					
5. Situation	Employers' offer 54s.; Trade union's offer 57s. Employers' probability 33½%; Trade union's probability 25%. Workers have to yield.					
6. Situation	× Employers' offer 54s.; Trade union's offer 54s. Employers' probability 0%; Trade union's probability 0%. Agreement: 54s.					

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it within the same wage interval. As has been seen, the workers showed a willingness to risk constantly decreasing probabilities of conflict as the higher wage rates came up for deliberation, beginning with 100 per cent. at the lowest end of the range of practicable bargains. Similarly, they will imagine the employers to have a series of probabilities beginning with 100 per cent. at the top end of the range of practicable bargains which decreases gradually as the rate falls.

If we consider the position of the parties at a possible negotiation concerning various wage intervals of 3s., we may imagine the scales of probabilities to be as indicated in the table below. The scales are here supposed to correspond to quite similar views entertained by the leaders of both organisations. Now, if both parties had a perfectly accurate perception of each other's circumstances, and the risk which the other party was actually willing to run, i.e., were aware of the other party's economic and psychological presuppositions, but not of their tactics in the particular instance, it would seem that the settlement were bound to fall at a definite point. In Section A of the table above, how great a risk of stoppage either party will be willing to run for each step of 3s. is stated, but as a matter of fact the negotiations will only touch on a limited number of possibilities. Corresponding to the definite figures of the table we shall, in practice, have a less precise tendency, to a certain extent, because each of the parties is not directed by the unchangeable will of a single person.

Either party will try to achieve the most advantageous arrangement. Only in so far as both parties knew all of each other's presuppositions, and were convinced that the

other would follow the wisest possible policy, would it be possible for either of them to calculate the result in advance. The result, however, is only brought about by mutual influences, a special form of the higgling of the market, not by competition, but by threats ; and each will try to convince its opponent that its own threats are better founded and more irrevocable than those of the other. Consequently, the point is not merely to know one's own presuppositions and those of the opposite party, for A will only yield gradually as it becomes convinced that B is thinking that it (B) dares run a risk of conflict greater than that which A is prepared to face at the same stage of the negotiations.

In the imaginary labour-market mentioned in the table, both parties knew their own presuppositions as well as those of their opponents in case of settlement and of conflict at each rate of wages. On the basis thereof, they have calculated the same probabilities which workers and employers respectively, dare risk within each of the intervals. We shall now be able to see what the result will be when the negotiations are concerned with the wage intervals of the smallest practicable size—3s. ; if they start with larger intervals, it will be in the interest of the party that dares risk the smallest probability of conflict to shorten the interval by a concession. In the above examples equilibrium can only be established at 54s.

In reality, the parties will be greatly removed from one another to begin with ; we may, for instance, imagine them to be proceeding in the manner indicated in the example in Section B of the table. The employers begin by demanding a reduction of the rate to 45s., and the workers, by demanding 66s., i.e., a claim beyond the utmost point the employers can

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afford (situation 1 of the table). Both parties will here prefer unconditional conflict to submission (100 per cent. probability). However, both parties, as presupposed, prefer any rate above 45s. and below 63s. to a conflict ; the workers, for instance, will reduce their claim to 60s. (situation 2). They themselves constantly prefer unconditional conflict to the 45s. which the employers have offered them, but by yielding they succeed in forcing the employers into a situation where the latter must yield, because they are only willing to risk $83\frac{1}{3}$ per cent. $((60-45) : (63-45))$ probability on a claim of 45s. when they can have a settlement at 60s., whereas the workers will risk 100 per cent. If now the employers offer 51s. (situation 3), it is the workers who only dare risk 60 per cent., and consequently will prefer to make a concession to the employers, who dare risk 75 per cent. As long as it is necessary, the parties will constantly try to undermine each other's desire of opposition by making greater concessions than they have done, but as far as possible they will not yield more than what is strictly necessary, if there is only a slight possibility of striking a good bargain. If, during the negotiations, the parties get into a position where they run an equal risk (for instance 50 per cent. each as in the interval from 51s. to 57s. in situation 4), they will both be interested in making concessions, as a conflict in that case will be the greater evil to each. Wherever they begin, and whichever method they follow, the negotiations must—under the imaginary circumstances which we assumed—end at one single point—settlement at 54s. (situation 6).

If, however, any other rate of wages is being discussed, either one or other of the parties will find it advantageous to make its opponent withdraw a step, by threatening it,

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and it will be to the advantage of the latter to yield as soon as the danger of war reaches a point beyond that which it itself dares risk, but denoting a probability less than that which the other dares to incur.

This concrete example will probably best show how the deliberations and actions of one party will make the other change its deliberations and actions. The result, however, will not be indeterminate or consist of indeterminable fluctuations to and fro, for in the case of both it is constantly a tendency in the same direction ; generally, there is no going back upon an offer that has once been made, and concessions on the part of one party will force the other to do likewise. If they act rationally, the movement will continue until a point is reached at which there are no conditions for any further movement.

In the example of the table, it is clearly seen that the parties will meet midway. If it were a question of very small intervals, as for instance a farthing per week, the same fact would appear still more clearly. The two equally great probabilities at the point of meeting would be the small wage interval divided by the equally great distance from either of the outer points. That the parties will meet midway, will also be evident from the general formula mentioned in page 114 as to the probability of conflict. The workers will, in a given wage interval, risk a probability of $c=r:(m+r)$, i.e., the proportion between the length of the interval and the distance to their utmost limit. The employers have a similar formula applying to the same wage interval of $c_1=r:(p+r)$; and the distance between the outer points $r+m+p$ is given (p being the distance between the fighting point of the employers and the furthest limit of the fighting

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sphere, corresponding to them of the workers in Fig. XXVIII). The workers will now have to yield, so long as m is greater than p , and vice versa ; so long as r is greater than 0, one or both of the parties will be interested in avoiding a conflict by making concessions. Consequently, in the given circumstances the result must be : $m=p$ and $r=0$.

5. ECONOMIC WARFARE AND THE VOLUME OF EMPLOYMENT (WITH TWO ABERRATIONS)

Hitherto, in this chapter, we have only dealt with those cases in which for a short period in the future the volume of production was absolutely independent of the height of the rate of wages, at least within certain limits. The rate, in these cases, could, neither wholly nor partly, be determined by an adjustment between the quantities supplied and demanded. These instances are illustrated by the abrupt turnings of the curves in Fig. XXV B and C. In real life, however, we shall more often have cases which, to a certain extent (i.e., to an extent insufficient to bring about a peaceful settlement satisfactory to either party), show an adjustment of the sales to the height of the rate, *cf.* the dotted roundings of the angles in the same figures and Chapter III, 6. The extent of the sales influences the attitude of the parties in the discussion of each higher or lower rate. A series of characteristic points is here of importance, i.e., the point of equilibrium at free competition and at bilateral monopoly ($q:2$ and $q:3$ in Fig. XXV A) or, if the latter equilibrium is impossible, the limits of the sphere within which rates cannot be determined by variation in sales (sales corresponding to p_1 and p_2 in Fig. XXV B and C). In this way the limits of

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the striking range are also influenced as well as the equilibrium within these points. But since the losses of the party through a stoppage at the same time influence the determination of the latter set of points, they will deviate from the former in one direction or other.

In cases where it is probable that a higher wage within the range of practicable bargains will involve diminished employment both of workers and of machinery, the expectations in case of settlement will, as far as both parties are concerned, be somewhat lower at the higher rates, and this will weaken the workers' eagerness to fight for too high a wage, and strengthen that of the employers, expressed in terms of the above-mentioned probabilities. Where such a bending of the curves has a strong influence, it may, in so far as it gets above the middle of the range of practicable bargains, probably be able to shift the point of equilibrium to a point somewhat below the middle.

It is, however, not only too high a rate, but also too low a rate, which may entail a decrease in employment. If the rate decreases, the volume of employment will increase in accordance with the demand curve until its intersection with the supply curve, after which it will decrease in accordance with the latter. This fact is essentially of greater importance to the workers when they cannot get employment elsewhere than when they have access to other employment, even if not quite so well paid. Where a reduction of the rate causes an increasing number of workers to leave the trade, the advantages to the employers of a reduction in wages may be reduced thereby.

The reaction of the sales on the prices of the commodities may have an effect which goes in the opposite direction to

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the one here mentioned. In so far as production increases, the eagerness of the employers to fight for a reduction in wages will be relatively diminished if the change entails a strong decline in the prices of the commodities, whereas the opposite is the case when the workers are driven out of the trade, and the quantity sold is reduced thereby.

Furthermore, the effects of a change in wages on the volume of employment will very often be quite different in the long run from what they were within the first period of the agreement. It may, for instance, be possible in the beginning, to force a great increase in wages because of the existence of buildings and machinery, which are worth nothing if not used. The consequence, however, may be that the enterprises are not extended or kept in repair, and that at a given opportunity the high-priced labour will be substituted by an increase of machinery.¹ The monopolistic price policy is momentarily victorious, but in the long run, nevertheless, competitive equilibrium will assert itself—even though the result may be an absolutely different equilibrium from the one we should have experienced had the monopolistic interference not taken place. In a corresponding way it is conceivable that a monopolistic policy on the part of the employers may put a stop to the ingress of labour, and gradually drive the workers (especially the best of them) out of the trade. Of especial practical importance is a third case: a monopolistic price policy on the part of organised workers and employers, seen in the building trades, for instance, which increases the profits for both parties and at

¹ Gustaf Åkermann, *Realkapital und Kapitalzins*, and *Den industrielle arbetslönns utveckling och återverkningar*, 1927; Bertil Ohlin, *Sät Produktionen i Gang*, and his criticism of my book on the distribution of wealth in *Nationalökonomisk Tidsskrift*, 1929.

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the same time reduces the employment to a certain extent. It must in this case be possible to prevent unorganised competitors from intruding into the trade.

FIRST ABERRATION : A MONOPOLISTIC INCREASE IN WAGES AND TOTAL WAGES

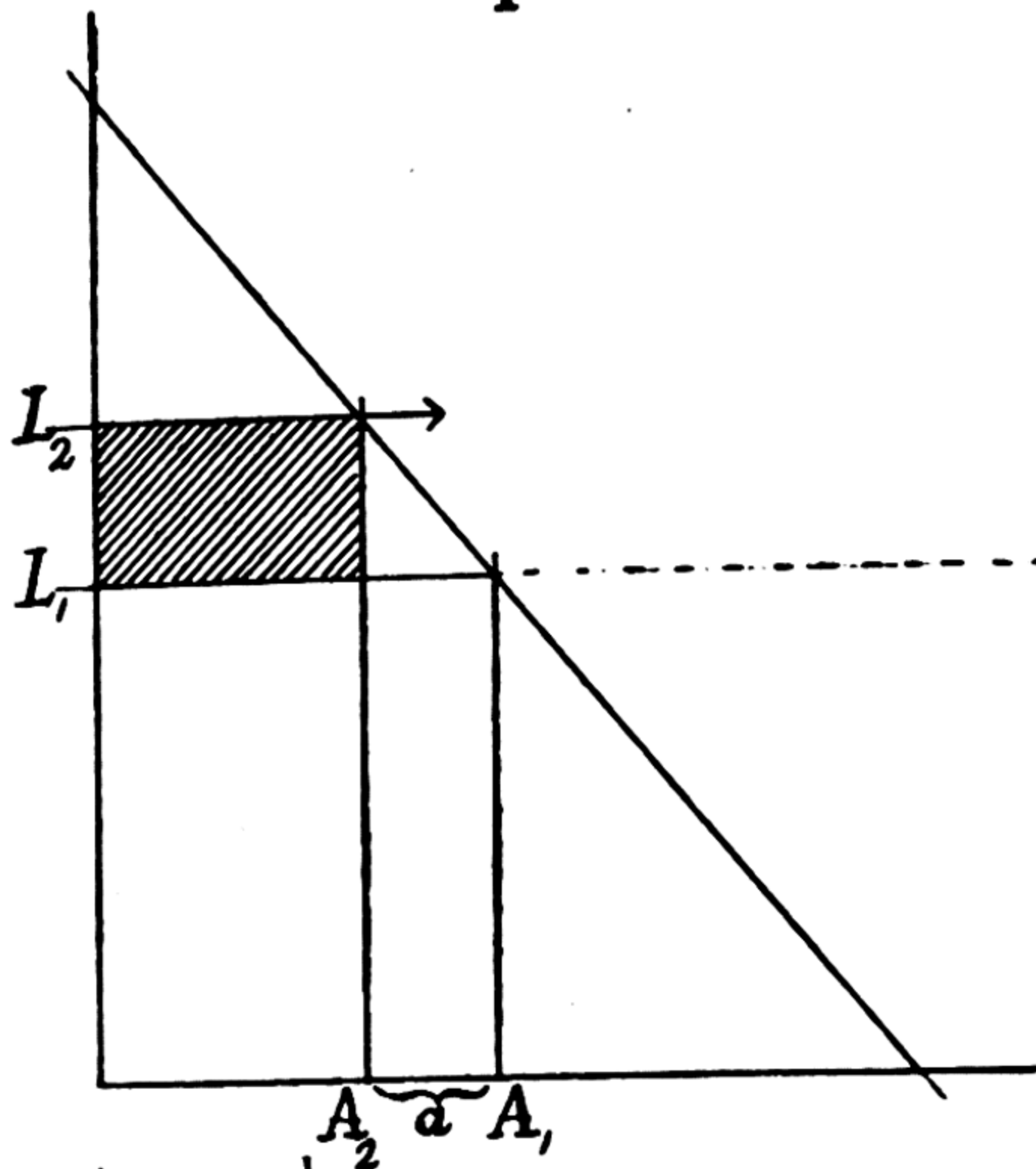
If the possibilities of employment are restricted in certain parts of the labour market, the result will be an increased supply of labour in other spheres ; but it is wrong to conclude that the gain in wages in one market—according to a kind of wage-fund theory—will equal exactly what is lost elsewhere. The amount of labour may, however, be regulated by means of unemployment benefits and reduction of working hours.

The curves in the above Figures XXIX, 1-6, indicate the amount of labour in three pairs of labour markets. The amount of labour in each market is first A_1 , and wages L_1 . If, now, wages are increased in one market (the figures to the left) to L_2 , the amount of labour will be reduced to A_2 , and a workers will disappear. Thus, in the second market there will be $A_1 + a = A_3$ workers, whereby the wages will decrease to L_3 . The increase in wages for the number of workers remaining in the market with the high rate, is illustrated by the hatched area in the figures to the left. The loss in wages to the original number of workers employed in markets 2, 4 and 6 is here the hatched area, and the loss to the workers driven out of markets 1, 3 and 5 and over to markets 2, 4 and 6, the dark area.

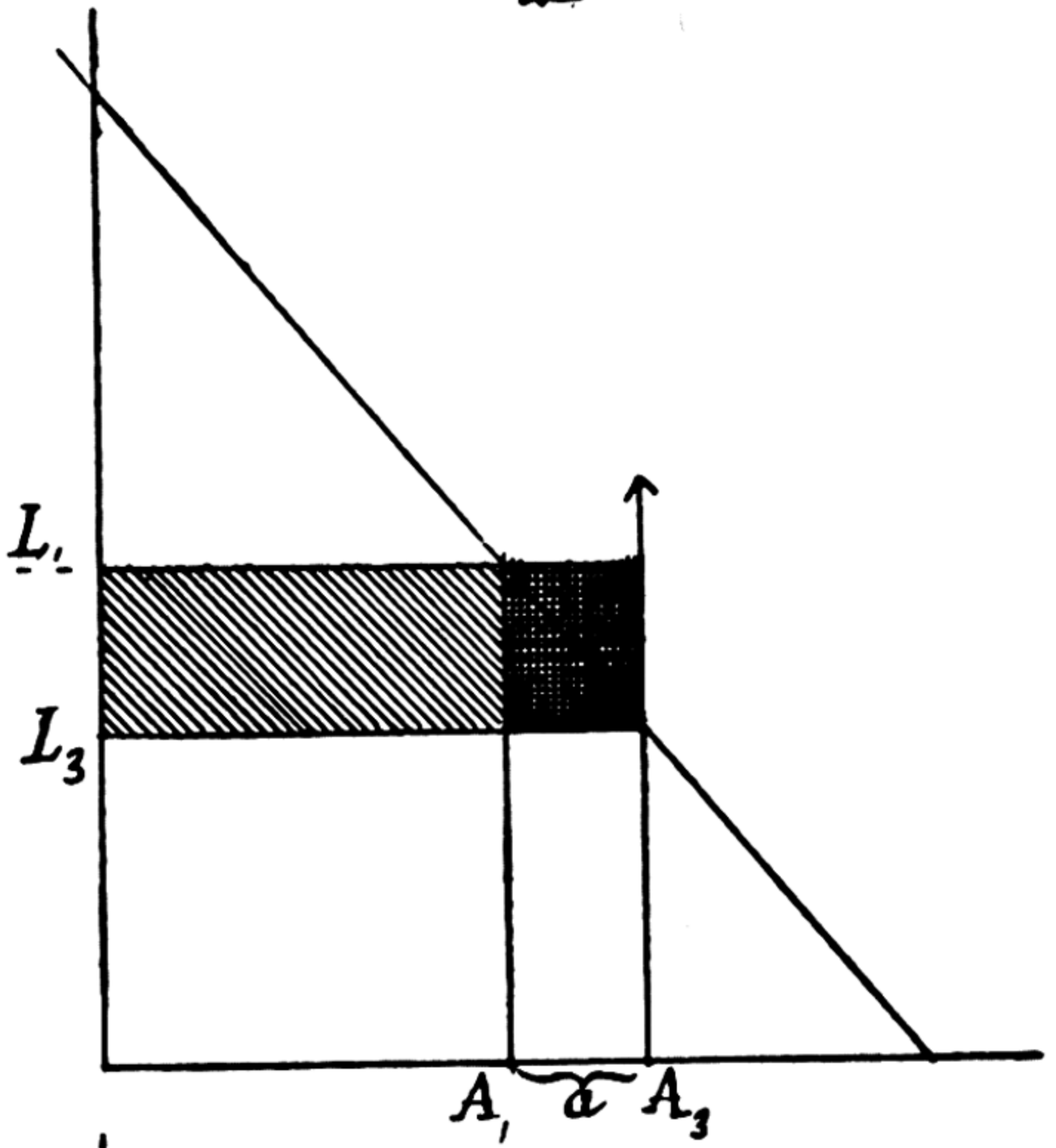
The proportion between gain and loss is now determined by the shapes of the curves. In figures 1 and 2 an unequal

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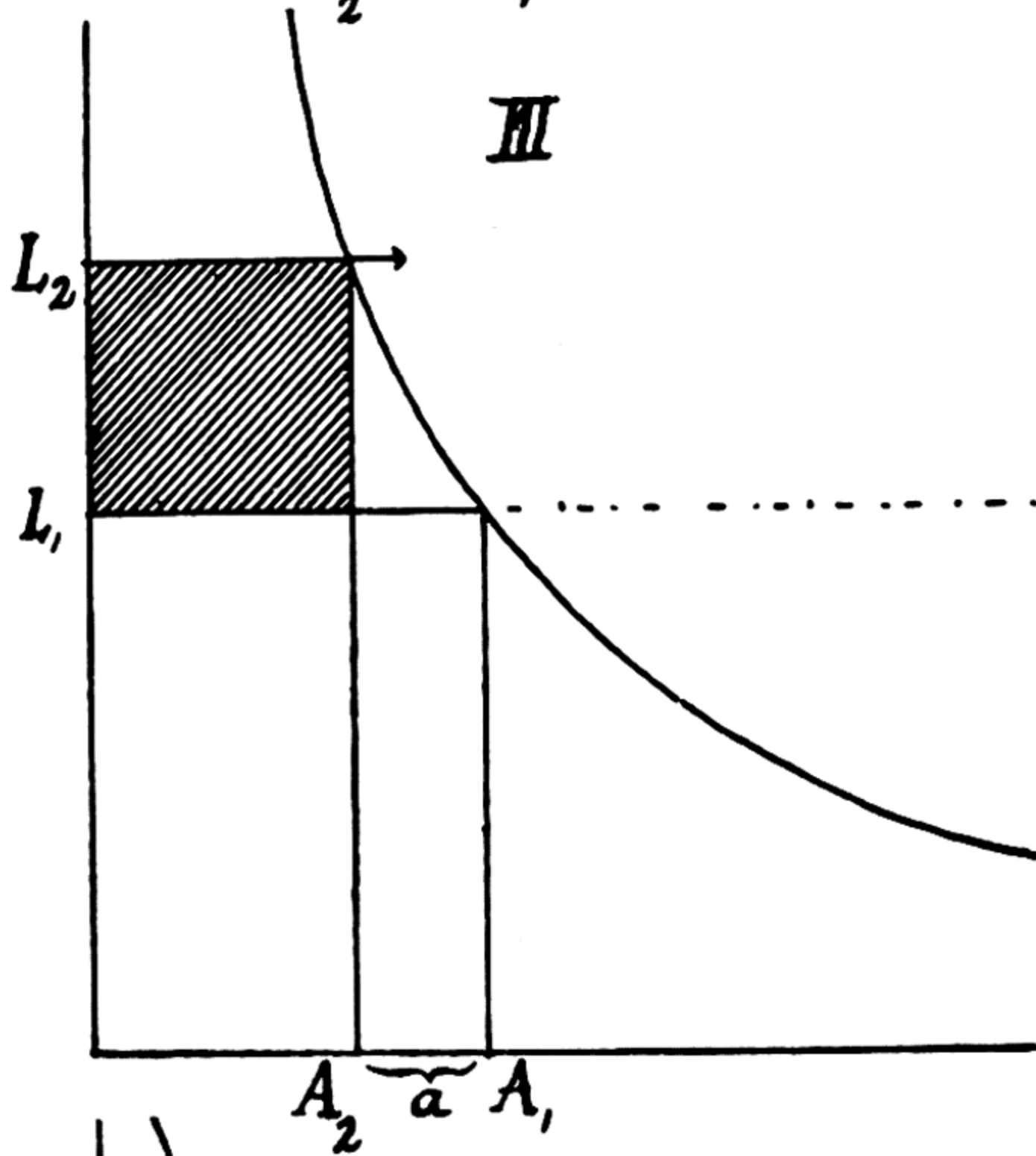
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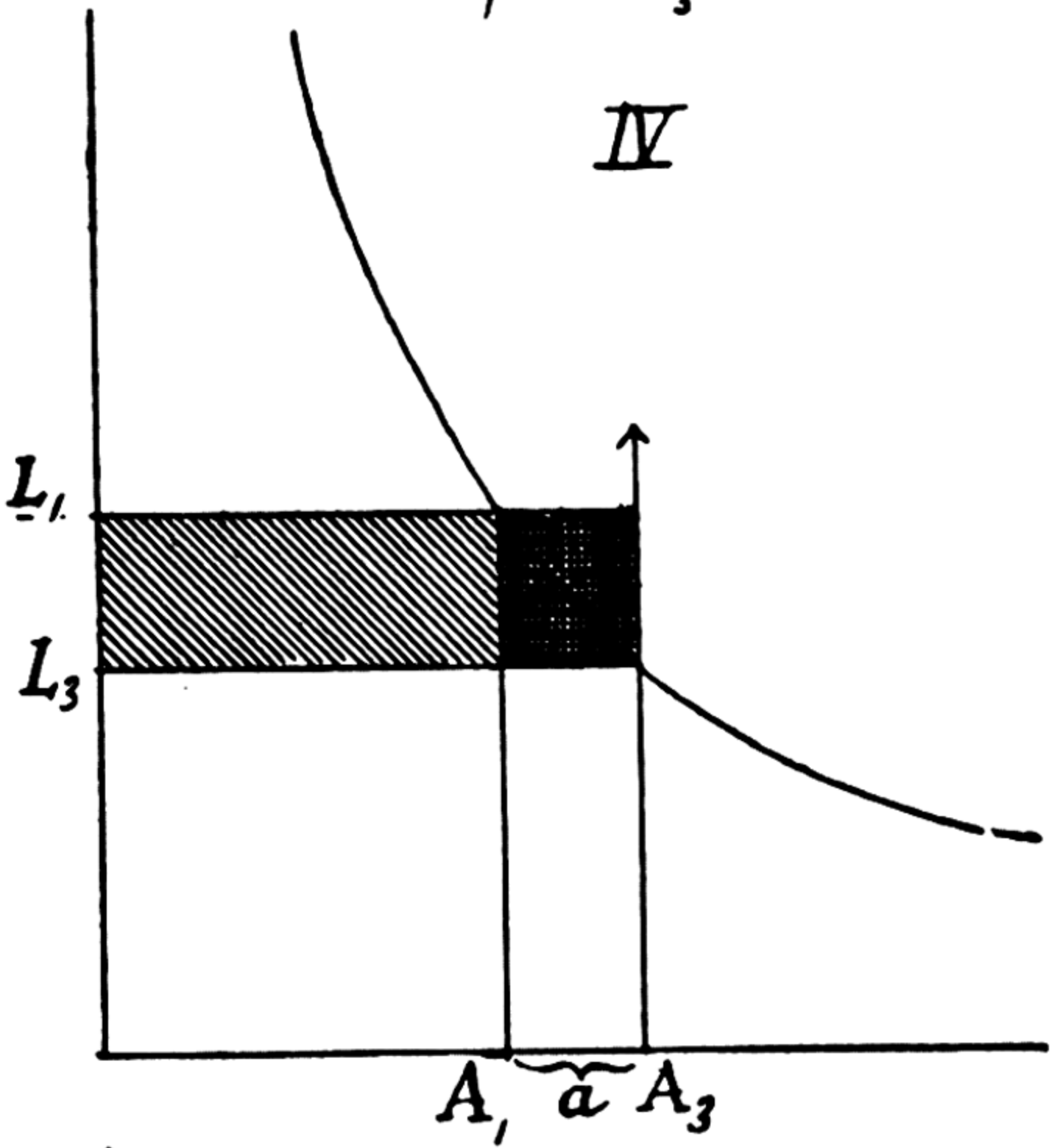
II



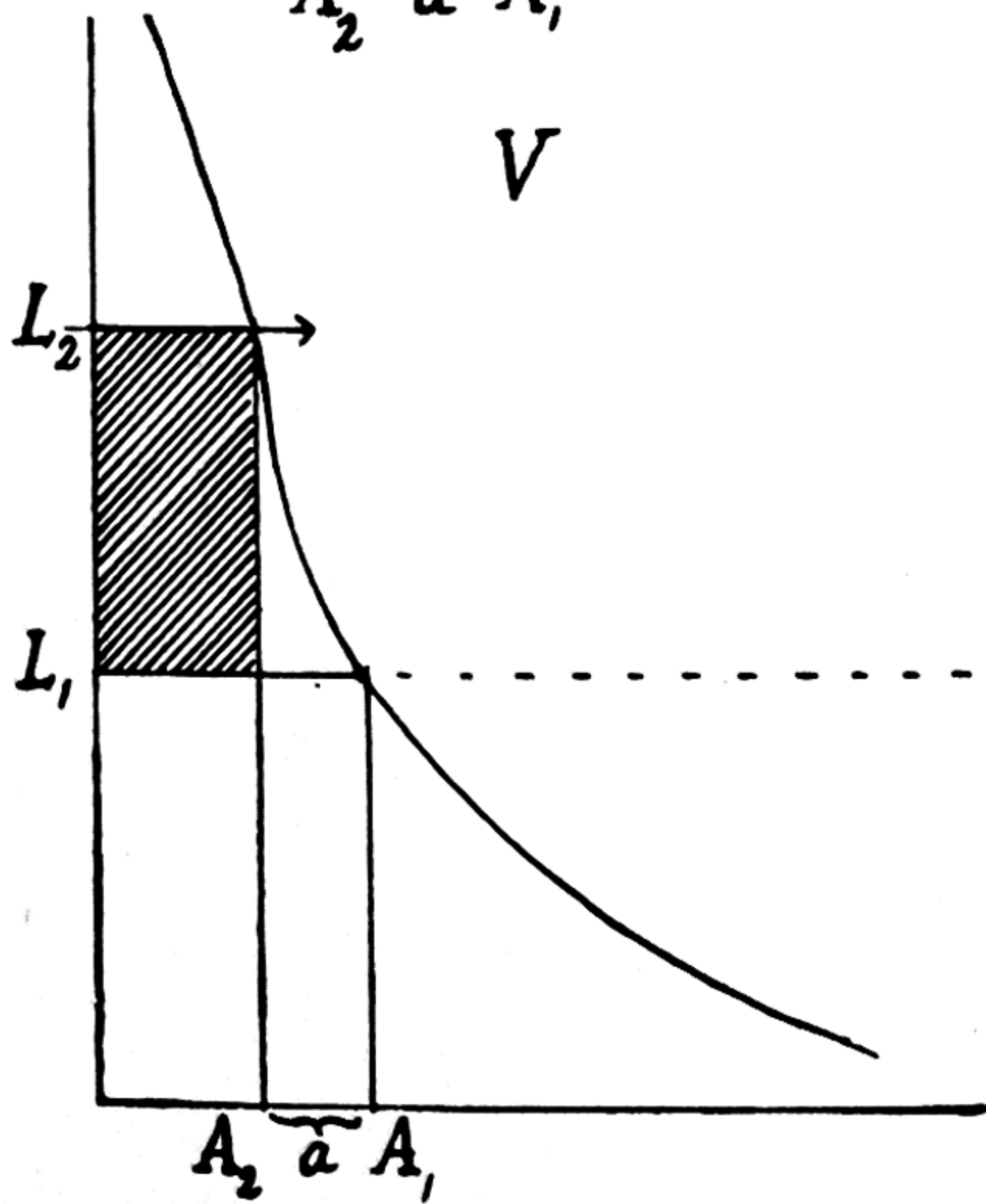
III



IV



V



VI

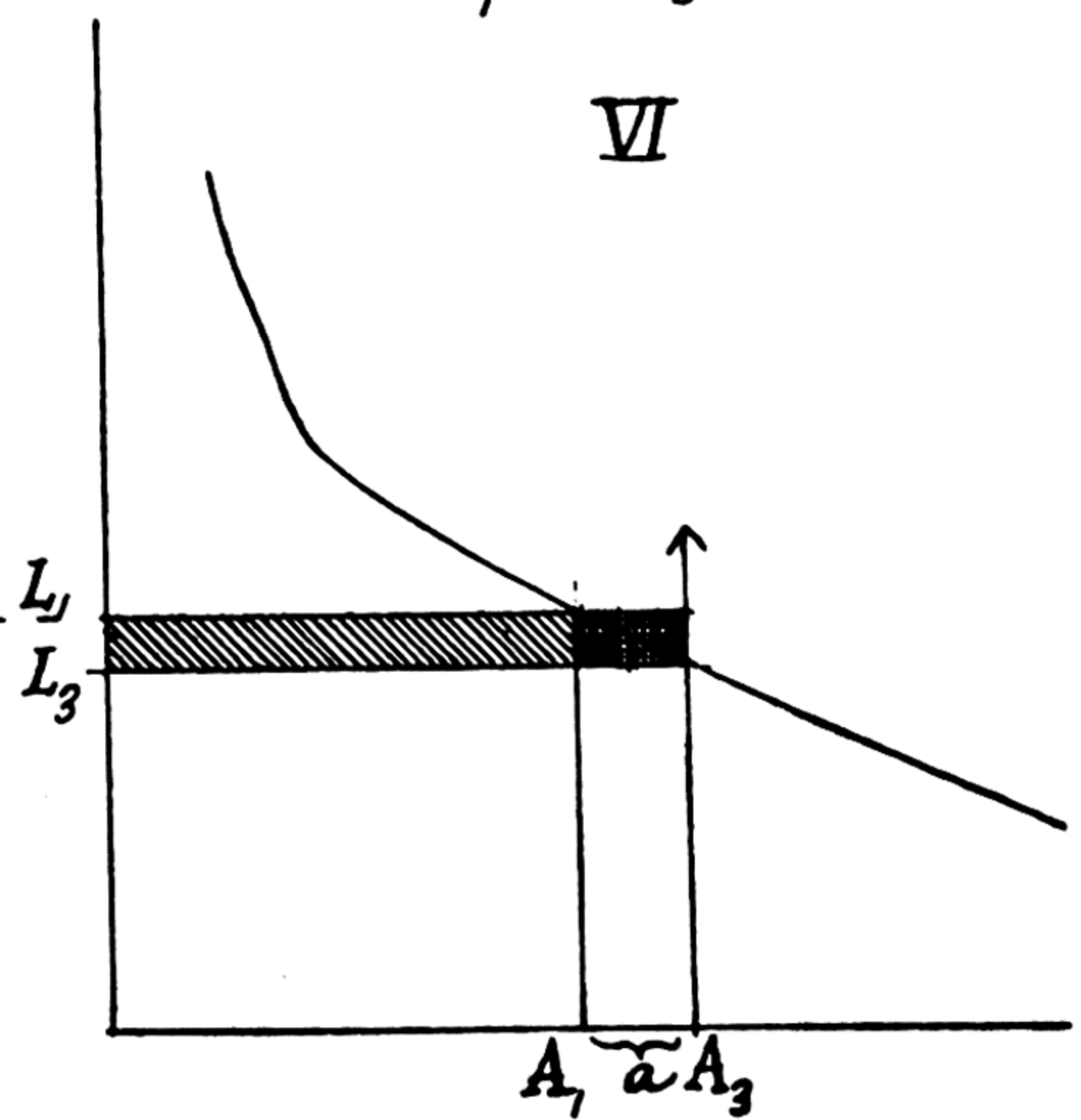


FIG. XXIX

PROBLEMS OF MONOPOLY AND ECONOMIC WARFARE

distribution between the two uniform labour markets entails a decline in the total sum of wages, therefore in the average wage. In figures 3 and 4 (where the curve is shaped like a rectangular hyperbola), the total wages will in each separate market be constant, irrespective of the supply of labour (or of the height of the rate). This involves that the total amount of wages in the two markets together, will be constant, irrespective of the distribution of the labour. A transference of labour from market 5, where the demand curve is steep, even at relatively large sales, to market 6, where the opposite is the case will, on the other hand, involve an increase in the total amount of wages, whereas a shifting in the opposite direction will have the contrary effect.

As, now, it is in those spheres in which a relatively large increase in wages can be obtained through a small efflux of labour when compared with the number of workers in the trade, that we find the strongest tendencies towards adopting a monopolistic trade union policy, there is reason to suppose that the total wages of the country, in spite of the reduction in the quantity of production, will in many cases be increased as a consequence of the division of the market effected by the trade unions. On the other hand, a hindrance in the movements between several uniform rural districts will probably lower the total wages.¹ As a monopolistic wage policy, owing to the hindrance of the mobility of labour and the unemployment it entails, may reduce the total production, the gain for the working classes of all countries will, at any rate, be smaller than one would have supposed beforehand. On the other hand, a rate which, to begin with, is screwed up a

¹ Cf. Bowley's article in the *Economic Journal*, 1912, "Wages and the Mobility of Labour."

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little above the momentary point of economic equilibrium, may gradually become economically justified on account of increased efficiency.

SECOND ABERRATION: HIGHER WAGES AND INCREASED CONSUMPTION OF THE WORKERS

We shall now tackle another, though somewhat more remote, problem. Will the increase in consumption due to increase in wages lead to a greater volume of employment?

In the first place, will this be possible at full capacity in the long run?

In the following imaginary instance we shall try to find the conditions necessary for an increase in wages to involve an increase in consumption by the workers of their own products so that the demand for the said products will remain constant. Thereby we shall also, if we proceed one step further, obtain the conditions for an increase in the total sales.

An enterprise produces 1,000 pieces in the course of a certain period; the wages are 100 per piece, and the price 200. If the rate of wages is now increased by 20 per cent. to 120, and the price to 220, the labour income rises from 100,000 to 120,000. If we suppose 55 per cent. of the rise in income to be spent on buying the products of the enterprise, the workers can obtain 50 pieces thereby, and consequently, it will be possible to keep the quantity of production unchanged in case the former consumption (of which the workers may possibly themselves participate) at the ten per cent. increase in wages is only reduced by 5 per cent., i.e., in case the elasticity of the previous consumption is only $\frac{1}{2}$. The

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proportion between the decline in the previous consumption on one hand, and the rise in prices on the other, i.e., the greatest elasticity for the old consumption which may give equilibrium, is $\frac{1}{2}$. If the elasticity is smaller, the rise in wages will entail an increase in consumption.

To express it generally as a function of the decisive variables, the greatest elasticity (the proportion between the relative change in the opposite direction in sales and price) for the old consumption which will not reduce the demand for the article is $f.p : (p + s)$, where f is the part of the wage-increase spent by the workers to purchase the article they produce themselves (in the above, 55 per cent.), p is the proportion between price and wages (in the above, 2), and s the increase in the rate of wages (in the above, 20 per cent.). f is to be found between 1 and 0, normally comparatively close to 0. p is greater than 1 (and generally essentially greater); $p : (p + s)$ is smaller than 1,—and in so far as it is only a question of tendencies towards a rise in the price, equal to 1. The formula, therefore, will normally give a result which is essentially less than 1; f , especially, as a rule is small if it is a question of a limited sphere of wages. This means that only where the old consumption is very inelastic, will there be any increase at all in the total demand. The articles in question must, consequently, be firmly demanded by the old consumers, and on the other hand, there must at the same time be a greatly increased demand on the part of the workers, who must spend a very great proportion of their extra wages on the purchase of their own product. This seems, beforehand, improbable, but it may form an exceptional case with an enterprise such as the Ford factories (before the competition became too heavy), in which one may expect a very

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great proportion of the wages beyond a certain limit to be spent on the purchase of Ford cars.

For much larger spheres, all labour in one or several countries, for instance, these conditions, however, cannot possibly be complied with. The conditions which we have found necessary for the exceptional case themselves show that they will not be present in large spheres, because the expenses cannot at the same time be raised on all sides without involving a corresponding rise in prices.

Now, if we leave the assumption of "the long run" and consider cases with unused capacity, p will decrease at an extension of production. Under such circumstances it is more probable that a rise will in special cases counteract unemployment.

We have, in this section, touched upon a number of important practical problems which are closely connected with the interests of workers and employers in changes in the rate of wages, as for instance, the effects of the elasticity of demand on the volume of employment and thereby its influence on prices. As a less important digression we have dealt with the possibility of increasing employment through increased consumption (which is absurdly exaggerated in popular discussions, but which perhaps are too easily ignored by some economists). Finally, we have pointed out the fact that the results obtained by fighting will often be of a very limited duration. It follows also, that the immediate liberty of action of the parties will be restricted, since they will, as a rule, be interested in the future development, and since it may be to the detriment of both to force a rate of wages that will not hold in the long run.

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Now let us return to the symbolism we applied previously in this chapter : increasing possibilities of employment at certain changes in the rates of wages enhance the expected values of these, and thereby the corresponding eagerness to fight ; but as soon as the point of greatest possibility of employment has been passed—the economic equilibrium under free competition—the expectations decrease, and the eagerness to fight is influenced correspondingly. The stronger the effects of the rate on employment, the smaller the deviation from the “ economic point of equilibrium ” (i.e. the competitive equilibrium, here not very different from that of the bilateral monopoly). The more equal the estimate of the parties concerning the sacrifices of warfare, the smaller will be the deviations of the point of equilibrium, (i.e., equilibrium in the organised market), from the probable issue of a fight. The probable result of a fight as well as its deviation from the latter point of equilibrium is influenced by the ability of the parties to wait, i.e., by their subjective rate of interest or, at any rate, the conditions determining it (*cf.* the first point in the next paragraph). Only in case this ability is unlimited will there be no point of equilibrium ; otherwise there exists an economic equilibrium also when both parties are organised, but an equilibrium of which the subjective rates of interest of the parties form a part.

6. OTHER DEVIATIONS FROM THE SIMPLE SOLUTION

In paragraph 4 we showed that under certain simplified assumptions the parties would meet at the point midway between their utmost concessions. In the preceding paragraph we dealt with the most important circumstances

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influencing the expectations of both employers and workers at each rate of wages, and thereby, their eagerness to fight, as well as the point of equilibrium. On the whole, deviations from the middle take place, when the expected values in case of settlement do not—as we have hitherto assumed in the formulæ above—move proportionately with the changes of the wage, and when the expectations in case of conflict are not independent of the wage. None of these assumptions are quite applicable, even though the deviations may not be very great. Especially as far as the workers are concerned one may conclude that the expectations in case of settlement will not move proportionately with the change in the wage, because here, too, a great loss is felt relatively more than a small loss or a small gain. The bending of the line A—A in Fig. XXVIII (for instance a lowering of A_3 to E_3) and the corresponding curve for the employers, will cause the progressions of probabilities to decrease more strongly. The parties become more peaceable, and in so far as it is mainly the workers who become more peaceable, the point of equilibrium—on account of what is usually the workers' smaller ability to wait—will fall to a rate somewhat below the middle. The large sum of money is valued relatively less than the small one, and the future income less than the present one, which in the sphere here dealt with, will often be a condition of life. These are the same points of view which are applied elsewhere to the question of the rate of interest. (Whereas the bendings of the curves mentioned above will shift the point of equilibrium, the greater or smaller slope of the curves, i.e., the proportion between the values of settlement and of conflict at the particular rates, is unimportant, as will be evident from the above formulæ,

and from the fact that the proportion $A : B$ in the figure is a straight line.)

A conflict will probably be most protracted if it is occasioned by an extreme claim, which will be in accordance with the circumstance that the curve $B-B$ in Fig. XXVIII is actually somewhat arched (for instance B_3 raised to F_3). This fact, however, will scarcely involve any considerable shifting of the point of equilibrium, and in any case scarcely increase the probability of conflict, generally speaking.

Furthermore there are certain rates at which the eagerness to fight is suddenly and relatively strongly increased for psychological and practical reasons, i.e., the money wage hitherto paid to the workers, or the wage calculated according to a generally accepted index, or the profit hitherto obtained by the employers for instance.

Finally, there is a fifth condition that may be imagined to involve a shifting of the point of equilibrium. We have, up to now, paid no regard to risk-taking, i.e., the unpleasantness of uncertainty, and have reckoned exclusively with the expected values as they would be accounted for by an organisation that was so rich that $\frac{1}{10}$ probability of settlement, which involved for instance 10 million units of utility, was of the same value to it as $\frac{1}{2}$ probability of gaining 2 millions, the same being the case with regard to the costs of war. As the great gain is generally of comparatively light weight, and the great loss of comparatively heavy weight, the probabilities which the parties are willing to risk will be calculated somewhat more cautiously than they would according to the mathematical expectations. This will surely tend to make the prospects of peace noticeably greater, and may shift the point of equilibrium in a manner somewhat to the

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detriment of the most cautious and, so far, the weaker party. This may well be the workers who are the poorer party, but it may also be the employers if they are most strongly tied to the trade.

As the probabilities expressing the eagerness of the parties to fight at various rates of wages, according to the preliminary, theoretical solution were decreasing in the, to begin with, steep progression of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, it will (even with the later modifications) be highly improbable that the settlement will be made near any of the striking points. If nothing else is known about the modifying elements, there is a reasonable presumption that the middle of the range of practicable bargains will be the surest meeting-place of the parties.

If there is a range of practicable bargains at all, i.e., if the striking point of the workers falls at a lower rate than that of the employers, the two series of probabilities are bound to meet. Both of them begin at 100 per cent., decrease as they approach each other, and will at an "unreasonably" far-reaching claim fall to 0.

Intersection in the middle does not mean that the unequal eagerness of the parties to fight will not influence the result : it is fully effective in the determination of the striking points, which again determine the middle. It is only increasing or decreasing strength within the range of agreement, however (an arched or sunken bending of A—A divided by B—B in Fig. XXVIII) that causes the point of intersection to fall after, or before, the middle.

Consequently, at mediations, which are not intended to shift the balance of power, it would seem a correct method to find out which rates are equally unfavourable to either of the

parties as a conflict, for instance 63s. for the employers and 45s. for the workers, and then split the difference. If, however, the only certain information to be obtained is that the employers may be supposed to agree to 48s. and the workers to 57s. for instance, the uncertainty is considerably greater, because it is difficult to know whether there is an equal distance from those two points to the point of intersection, i.e., if there is any possibility at all of a settlement. In so far as it is not a question of technical details in a proposal of settlement, it may perhaps be taken as the best sign that the parties are "equally dissatisfied"—i.e., that neither of them can threaten the other effectively because they are willing to risk the same probability of conflict. Without knowing the outer points, a direct attempt may also be made to ascertain whether the probabilities seem to be equal by calculating for each party the proportion between the gain and—if a settlement is not reached—the loss, by a small change of the rate near the possible point of settlement. If one takes a point between the greatest concessions it is possible to force the parties to make (for instance employers 48s. and workers 60s. ; *cf.* above), it would also be useful by means of the same method to find out if the parties were at the same distance from the point of settlement. We do not venture to say how far these methods may be applied to real life but, in any case, they are the consequence of the theory laid down in the present chapter.

7. APPLICATION OF THE IDEA OF PROBABILITY

We have here examined the cases where the parties were fully aware of the objective basis of each other's deliberations. The factor determining the course of the negotiations is

the readiness of the respective parties to fight, calculated in terms of the probability of conflict to which they will expose themselves at each of the wage intervals under discussion during the negotiations. Just as in the market of a certain commodity, we shall, where the parties have a correct conception of each other's readiness to fight, have a demand curve and a supply curve in which to each price there corresponds another quantity (probability), which at the point of intersection will be equally great for both parties. The estimated gains and costs of the parties in terms of money or utility, are, on the other hand, only middle terms in the train of thought leading up to what is the decisive factor in relation to the opposite side: the magnitude of the probability of conflict to which they will expose themselves at a particular wage.

Of course, speaking of probabilities is a theoretical construction, when elsewhere it is assumed that everything is definite and clear to the two parties concerned. However, if both parties knew all objective circumstances and the train of each other's thought up to the moment when the decision was to be made, the result of their knowledge would even find expression in the amount of risk of conflict they were willing to run.

8. MISCONCEPTIONS OF THE OTHER PARTY'S EAGERNESS TO FIGHT

Just as in other fields of economic theory, it has been calculated here, what the parties would have to do, were they to act absolutely rationally—the manner in which their action actually differs from this, may then *per definitio*, be termed uneconomic. In that way we manage to divide the problem,

so that the preliminary theoretical solution is achieved on a purely economic basis ; after that we may proceed to a purely psychological and sociological examination of the nature and extent of the deviations. The way in which these react on the wage, once more—like the doctrine of monopoly prices—becomes a question of theoretical economy, to which we shall here directly proceed.

Real life differs from the preliminary theoretical solution, partly by the parties miscalculating their own readiness to fight in relation to the objective circumstances—demand and supply of commodities and labour at different rates of wages, costs and chances in a conflict, etc., and partly by their misconception of the actual readiness of the opposite party to fight, whether this be right or wrong in relation to the objective circumstances. The former error causes the result of the negotiations to tend towards a different rate of wages, while otherwise the result would be arrived at in just the same way as described above. In the second case, the wrong estimate of the other party's readiness to fight not only influences the height of the resulting rate, but also the manner in which the negotiations are carried on. Finally, the circumstance of the power being distributed among several persons, some of whom will be acting from less rational motives than the others, involves that any rational solution will only indicate a tendency.

If either party over-estimates the warlike tendencies of the opposite side, peace will easily be made, so that one or both unexpectedly strike a good bargain. If, on the other hand, both under-estimate each other's readiness to fight, and consequently forward unreasonable claims, a conflict is likely to ensue. If only one party makes a wrong estimate,

the result will be the same, whilst if they make wrong estimates each in their own direction, the difference between these will determine the manner in which the settlement is made, whereas the common part of the mistake will react directly on the wage. For the sake of simplicity, and in order not to be unkind towards anyone, we shall, in the following, restrict ourselves to the cases where both parties over-estimate or under-estimate each other's eagerness to fight.

In cases where the parties entertain wrong conceptions of each other's position, the limits to which either of them will advance their claims, are determined by the point where the risk which they are willing to incur (determined independently of the other party's supposed decision), coincides with the probability of conflict which they believe the other party is willing to risk. In order to give a clear statement of the case where the parties have wrong conceptions of each other's eagerness to fight, we have—without attaching too much importance to the shape and height of the curves—in Figs. XXX and XXXI, drawn curves to indicate, partly the respective eagerness to fight of the two organisations and, partly, the eagerness that either imagines the other to have. The even course of the curves, corresponds to very small intervals between the rates under deliberation, but in order not to make the curves too low, their heights have been made approximately to correspond to the intervals indicated in the example A of the table. As the parties do not meet at the negotiations with their minds made up as to the position of the rate, but only with certain suppositions regarding their own attitude and that of the opposite party towards any rate of wages, it will be insufficient to make their presuppositions only as to the striking points and the point of meeting.

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Fig. XXX below shows an example where both parties over-estimate each other's readiness to fight, and Fig. XXXI an example where the opposite is the case. Along the horizontal axis in Fig. XXX have been marked off rates within the range of practicable bargains, from the striking point of the workers up to that of the employers (in the numerical example above 45 and 63 shillings); along the

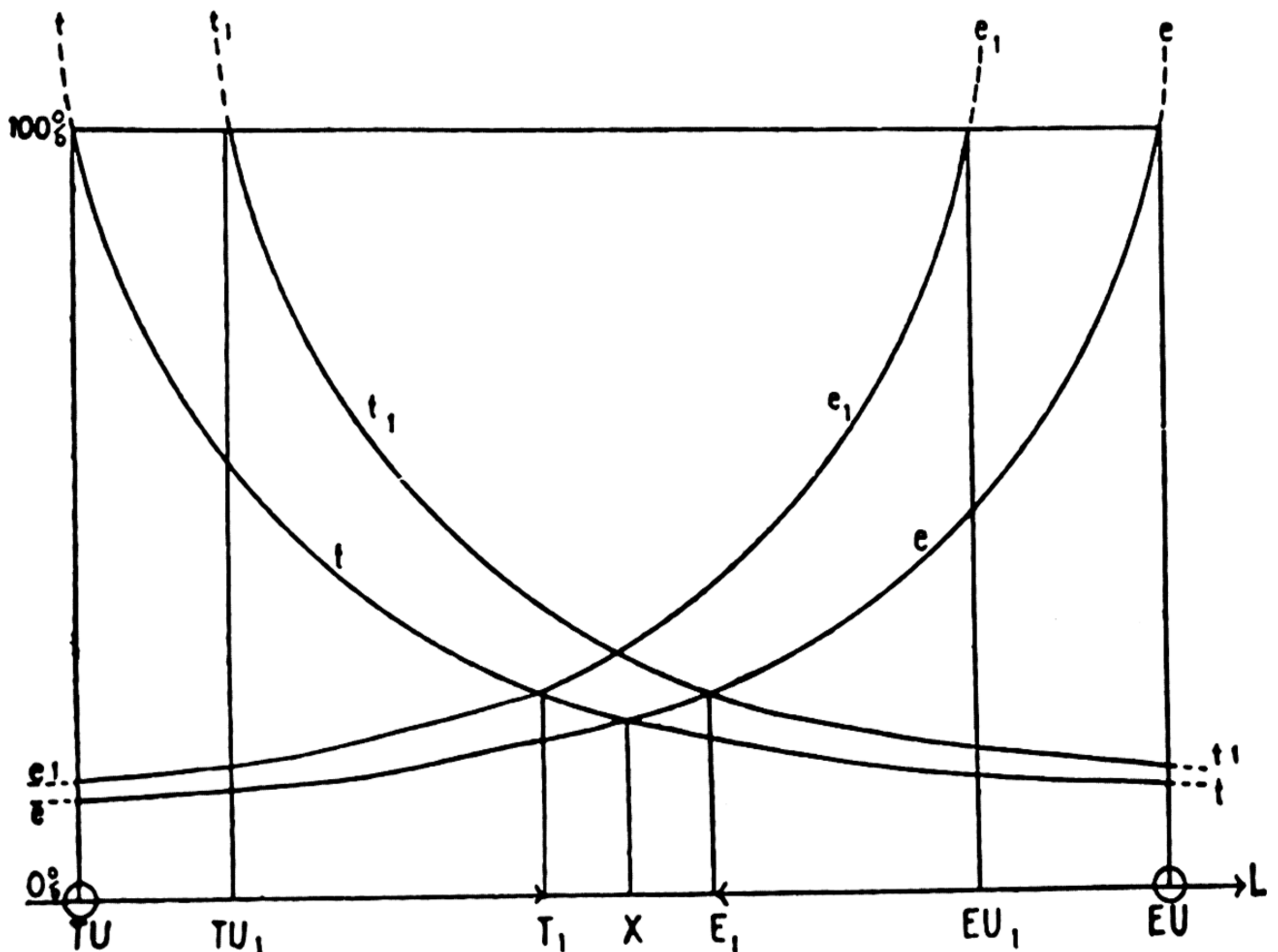


FIG. XXX

perpendicular axis we have marked off, the probabilities of conflict which the parties are willing to incur in order to gain a little bit forward, at these rates. e and t indicate the probabilities of conflict which the employers' association and trade union, respectively, are willing to incur at the various rates. Similarly, e_1 indicates the workers' exaggerated ideas of the employers' readiness to fight, and t_1 the corresponding exaggerated ideas of the employers. As

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will be seen, the trade union thinks that the range of practicable bargains is the distance $TU-EU_1$, and the employers' association that it is $EU-TU_1$, and but for these exaggerated ideas, the point of settlement would be at x ; however, on account of them, the employers will only risk an ultimatum on a wage reduction to E_1 , determined by the point of intersection between t_1 and e . In this case, when the parties are "too" peaceable owing to exaggerated ideas of their opponents' readiness to fight, they will easily agree within the range E_1 to T_1 , because they will both think they have struck an unexpectedly good bargain. Within this range, which will probably be much narrower than the range of practicable bargains as determined by the conditions which either of the parties consider equally burdensome as certain conflict, the wage problem actually appears indeterminate; this is not the case, however, even though the economic tendency here is considerably weaker. If, for instance, at a rate of 10d. an hour, the workers have reached a point beyond which they will not advance their claims because only wanting to incur a risk of 50 per cent. for a small increase in wages, and at the same time thinking that the employers too will risk 50 per cent. probability of conflict, it is correct to say that normally, they dare not put forth or maintain any further claims in the form of an ultimatum. So far as one thinks it will pay at all, it is certainly most advantageous for the respective parties as truthfully as possible to couch their claims in the terms of a definitive ultimatum. It is now conceivable that the workers will only dare to risk 40 per cent. probability of conflict at a claim of 11d., while they think that the employers will risk 60 per cent. by refusing a rise from 10d. to 11d.; they might then

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tentatively forward a claim which they themselves have a possibility of abandoning later on. The prevailing methods of negotiation in connection with the smaller or greater excitement of the members as well as of the public, make it possible to advance claims with a series of varying degrees of absoluteness. The amount of energy and time spent on discussions on the forms of negotiation is the best evidence of the immense tactical importance which the parties attach to these forms (the access to ballot the members for recognition of a settlement, a binding mandate, etc.). Both parties will thus become more and more amiable the more they may expect to obtain beyond their utmost ultimatum points (T_1 and E_1). One must not think, however, that they will meet at the point where the amiability is equally great on either side—the total maximum of amiability will probably be reached at another point, and even this point may not be decisive. Nevertheless, the shape of the four curves will give expression to a series of conditions relating to economy and organisation, with the result that any settlement is not equally probable, even within the most indeterminate sphere (from T_1 to E_1). Against the apparent inconsistency of using another and more complicated method within the sphere that cannot be determined by means of the method of ultimatum, it may be urged that the same method will only lead to the following situation: If the workers are just willing to deliver and maintain an ultimatum at 10d., incurring a risk of 50 per cent, and believing the same to be the case with regard to the employers, they would, if possible, deliver more than an ultimatum at 9d. for instance, where they are willing to risk 60 per cent., only thinking the employers willing to risk 40 per cent. at the most. This

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only means that where the parties have special e_1 and t_1 curves, these will enter into the determination of the conduct of each towards the other, and consequently that of the probabilities of settlement and conflict at every discussion of two rates within the whole of the range of practicable bargains.

Figure XXXI similarly, shows the conditions in a labour market where the parties under-estimate each other's readi-

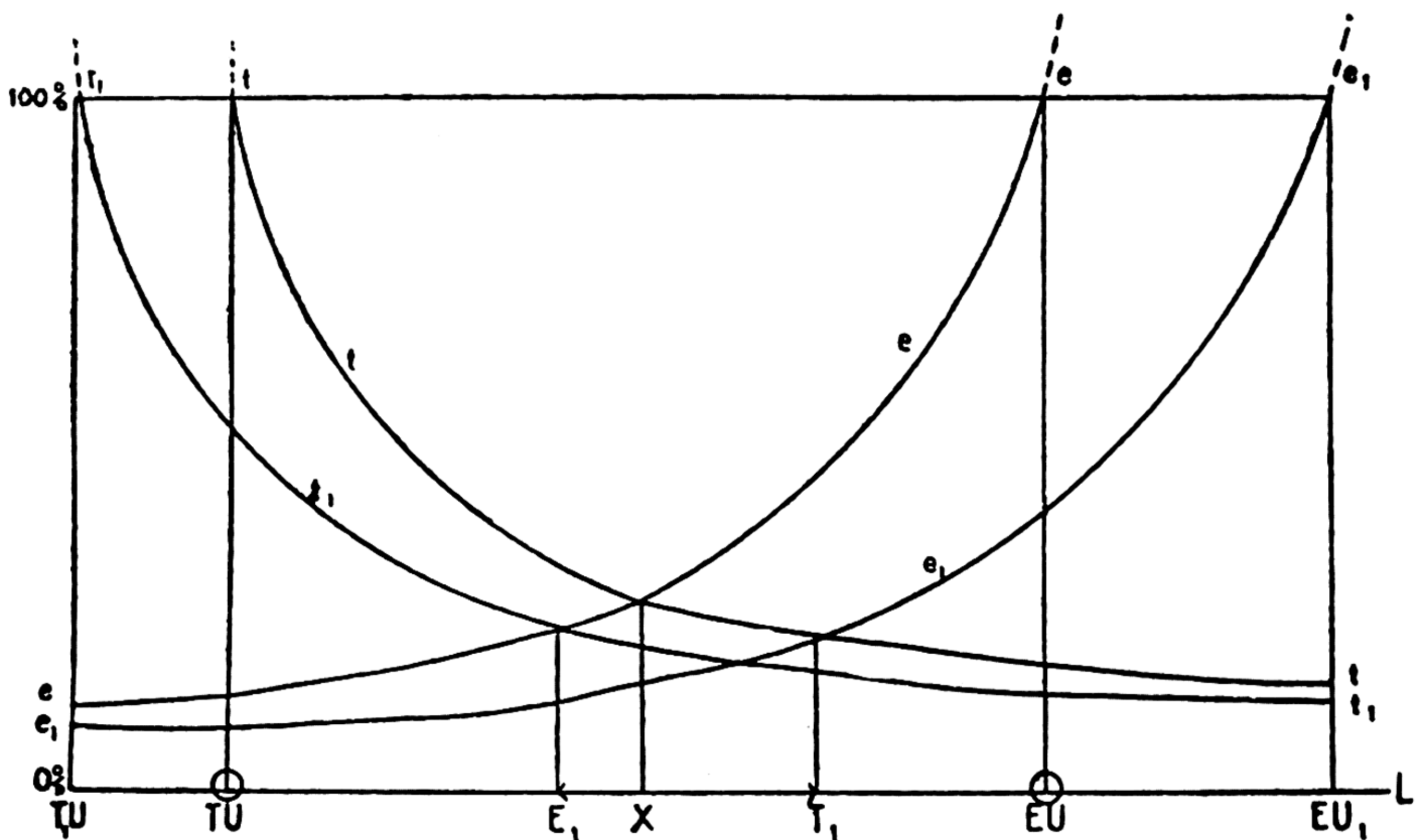


FIG. XXXI

ness to fight. Here a conflict must result, since the employers are not willing to offer above E_1 , and the workers will not be content below T_1 , in spite of the fact that any settlement within the whole of the range of practicable bargains $TU—EU$ will be to the interest of both parties. If, nevertheless, a peaceful settlement should be the result, in cases where the actual position of the leaders corresponds to this figure, and during the negotiations continues to correspond thereto, it will be due to other errors in the

reasoning of the parties, in the technique of negotiation, or finally, considerations outside the sphere of the particular conflict, i.e., considerations of the future or other labour markets.

When the parties meet, having made wrong conceptions of each other's readiness to fight, they will of course become better informed in the course of the negotiations, which none of the parties will be eager to discontinue so long as they find themselves negotiating within the range of practicable bargains, i.e., so long as both prefer any peaceful settlement to a conflict, and so long as one of the parties at least entertains hopes of a better solution. This involves an actual tendency towards the point of equilibrium of the readiness of the parties to fight, i.e., a solution of the problems in Figures XXX and XXXI by the curve e_1 becoming e , and the curve t_1 becoming t .

Owing to the inconvenience of running a risk, it is only in comparatively few cases that the negotiations will end with the situation in Figure XXXI, i.e., conflict.

9. THE SOLUTION AND ITS CONSEQUENCES

The solution is more uncertain than where supply and demand meet in a market—there is only a probable solution, just as the actual length of a man's life is with regard to the average length of life. The unknown quantities that must be reckoned with, introduce an element of casualty and chance, and the tendency of the parties to estimate wrongly, involves a deviation, the direction and extent of which are determined by the error in the understanding of the parties in question. It is, however, open to doubt, to what extent the uncertainty is greater within the range

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of practicable bargains than with regard to the fixing of the limits of this range.

Information as to the actual conditions and, by no means least, the relatively inaccessible information as to the profit of the enterprises—contributes to a peaceable and tenable solution and, moreover, a solution harmonising with the actual balance of power and economic conditions. Where the conditions in a certain industry are varying, it may be very difficult to make proper use of this information. If there are different estimates of settlement and of conflict within an organisation of employers or workers, the decision will be further complicated. The decision may be made either by a majority or by leaders, who in various ways try to balance the opposing interests against each other. In any case, however, the collective decision will be a sum of deliberations as to the probability of conflict they dare risk, deliberations undertaken by, or on behalf of, the individual members.

The claims of the parties and their readiness to fight have no direct connection with the economic point of equilibrium, meaning full occupation of all workers and all machines, i.e., the solution that would be attained by absolute freedom of competition in cases where employment is elastic. If one party is much more strongly organised than the other, the competitive point of equilibrium may be found outside the range of practicable bargains, and consequently, far from the point of equilibrium of the readiness of the parties to fight, which we have tried to determine in this chapter. This, however, does not preclude the possibility that the purely economic forces, which unequivocally determine the competitive as well as the bilateral monopolistic point of

equilibrium, are at the same time the most important factors in the determination of the equilibrium decided by economic factors and fighting in conjunction, *cf.* § 5.

From a political point of view, the present treatment of the question is only concerned with the more superficial reform—the abolition of the danger of conflicts or wrong decisions due to misunderstandings and the like—not with the more far-reaching question of the abolition of the elements of power, or the substitution of other elements of power in order to further definite aims.

The above theory also applies to a labour market where an organisation of workers is opposed to a single employer, and, with some variations, to the exchange of goods between two monopolists, whether it is a *barter* between two isolated individuals under primitive conditions, or a question of the conditions for co-operation between two great industrial concerns, firms controlling the means of transport and raw-materials, states, etc. In so far as two states are not bound by any League or other common authority at negotiations concerning a vital question, a point may be reached on either side, where one party may unconditionally prefer war to further concessions. Between these points there will be a range of practicable bargains within which either party prefers any peaceful settlement to war, but where one party may, nevertheless, deliver a seriously meant ultimatum, not because war will be less burdensome to the country in question than to the other, but because they reckon with the fact that the other party will not, by obstinacy on this point, risk as great a probability of war as they themselves. So far, human imperfection, here, as in the labour market, makes the problem indeterminate everywhere within the range of

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practicable bargains, because the negotiations *may* be discontinued at any point, and a settlement *may* be achieved at any point, possibly in such a way that the weaker party will get the best of it owing to good luck and ingenuity. The majority of the settlements will, here, as in the labour market, centre round the middle ; but what is to be the middle will depend upon the strength of the parties, i.e., the extreme points at which the expected value in case of war is equally great as the expected value in case of peace. Here too, increasing or decreasing strength gradually as greater and greater claims are set forth, may shift the point of equilibrium from the middle.

Just as in the labour market, information as to actual conditions, mutual understanding and reliable espionage are the most useful arms from an impartial (international) point of view. From a biased point of view, bluff and deception appear to either of the parties to be the cheapest and most effective mode of warfare—at any rate in the individual (isolated) case.

FO. THE ELEMENT OF FORCE. FROM MONOPOLY TO JOINT ECONOMY

Competition between a few enterprises such as the monopolistic competition with which we dealt in the second chapter, is a form of transition between the two opposite types of economic organisms—Competition and Monopoly. A third and quite new element is added, when two enterprises or combinations face one another as buyer and seller, and when the settlement is not made by a peaceful adjustment of price and quantity sold, but is brought about by

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threats of a temporary discontinuation of the sales, and if necessary, actual stoppage, possibly in connection with other, still more violent, means of warfare. The settlement is in this instance arrived at by means of force.

Some years ago, Austrian and German economists discussed at great length the problem of Force *versus* Economic Law¹ (Macht oder ökonomisches Gesetz). There is no reason to call wealth, demand, rareness or productivity by the name of force so long as they only act through the normal process of buying and selling according to the general economic laws, including the static laws of monopoly. The special element of force appears, however, when economic causation is disturbed by means which are unrelated to the ordinary phenomena of the economic process, as, for instance, when the State fixes a price, or regulates the extent or direction of the production, or when others achieve economic

¹ Among the advocates of the Theory of Force who are mainly influenced by Karl Marx and the historical school, we may mention Tugan-Baranowsky, *Soziale Theorie der Verteilung* (1913), Oppenheimer, *Wert und Kapitalprofit* (1922), Ernst Rothschild, *Kartelle, Gewerkschaften und Genossenschaften* (1912) and Rudolf Stolzmann; in England, J. A. Hobson, *The Industrial System* (1910); and in Denmark, Jac. Kr. Lindberg's article in *National-økonomisk Tidsskrift*, 1919 (cf. Alf Ussing's and my own criticism of it in the same Journal, 1920). American Institutionalism in reality scarcely differs much from the Theory of Force.

The more or less unconditional theories of force caused other economists to set forth arguments in favour of asserting the validity of the economic laws while at the same time trying to ascertain the importance which must be attached to the special factors of force: Böhm-Bawerk's last treatise (*Zeitschrift für Volkswirtschaft, Sozialpolitik und Verwaltung*, 1914), Schumpeter, "Das Grundprinzip der Verteilungstheorie" (*Archiv für Sozialwissenschaft und Sozialpolitik*, 1916-17), and particularly Carl Landdauer, *Grundprobleme der funktionellen Verteilung* (1923), cf. the treatise of the same author in "Die Wirtschaftstheorie der Gegenwart," Bd. III, *Ein-kommensbildung* (1928). The problem of force has been dealt with psychologically and sociologically in v. Wieser's book, *Das Gesetz der Macht* (1926), and by Keilhau, the Norwegian, in the article "Wirtschaft und Macht" (in *Jahrbuch für Soziologie*, 1926). Furthermore, the problem of course has a special application to the wages question, cf., for instance, Gösta Bagge.

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results by using or by threatening to use physical force, or only by stopping or threatening to stop normal buying and selling. Economic warfare by means of stoppage or threats of stoppage may easily develop in such a direction that other and stronger instruments of force are resorted to by the parties; the State, or other bystanders who are interested in the upkeep of production and in the determination of prices, may interfere, for instance, by enforcing compulsory arbitration in labour conflicts, or only by exercising an amicable pressure in order to persuade the parties to come to an agreement. The characteristic feature is that a solution cannot even be arrived at by an adjustment between price and sales, and that other means must be resorted to. Since the means nearest at hand—stoppage of production—is an unprofitable manner of warfare, other ways out are often sought.

The use of force against one another by organisations—by trade unions and employers, for instance—is in many cases only made possible by a use of force towards their own members, which, by the way, also applies to cases where it is only a question of maintaining a joint monopoly price. The immediate interest in an extension of the sales by individual members must, in case the feeling of solidarity does not suffice, be outweighed by penal clauses. The disadvantages of breaking the ranks determine how much a price or rate of wages may be shifted above or below the possible free price (the maximum for the monopoly price equals the free price plus the disadvantages of breaking the monopoly.) Force, then, does not set aside the economic laws absolutely, but the heterogeneous elements co-operate in a way which is quantitatively determined, such as has

also been illustrated by the specific case dealt with in this chapter. The power of the private organisations as well as of the State is limited by the purely economic conditions. If the commands of the organisation are too contrary to the immediate interests of the individual members, it may easily break up. The power of the State to fix a price or a rate of wages, is also limited by the possible free price or rate, plus or minus the disadvantages and the moral unpleasantness of breaking laws or regulations. Nevertheless, this often allows a large scope for the exercise of force.

Thus Force, whether consisting in violence or being only a psychological or moral influence, acts as a certain hindrance in the free endeavours of the individuals towards the immediate satisfaction of their interests. Together with the technical conditions, it forms the more or less strong walls of the economic cells, i.e. the individual enterprises and organisations (*cf.* pages 60 and 88). Since the use of force has often its price, it is obvious that the formation and upkeep of the cells as well as the adjustment between them, which we have dealt with in this book, are not incommensurate phenomena.

Authoritative regulations of economic conditions on the part of the State, for instance, must be uncertain, in so far as the elements guiding the private buying and selling are absent. A standard of measurement is needed other than the maximum profit of the individual. A choice must be made as to what is to be considered the political criterion, for instance, the greatest amount of contentedness in the long run for the community as a whole, or the like. It is characteristic of this state of affairs that each individual should not take care of his own interests, but that the

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political power should, at the same time, take several different interests into consideration and be the leader of a joint economy.

A similar problem as to purpose is apparent in the management of private combinations which unite opposing interests. The combination which was originally dictated by the interests of a number of private individuals may gradually become a semi-public institution. The economic action is here partly determined by regulations and forms of organisation.

Comprehensive vertical combinations do not arise only as a means of avoiding warfare or of solving the actual issues of conflict. A bilateral monopoly, however, leads easily to extreme limitations of sales, and thereby, to a reduction of the total profits also, and this may only be avoided by co-operation, combination or by one party buying out the other. It may also be that banks or groups by purchasing shares, gain control of the opposing enterprises, and force them to carry on a more or less common policy, whereby the total profits are increased, quite apart from possible technical advantages.

Where horizontal monopolies are followed by vertical combinations, the spheres of private interests rapidly become comprehensive enough for the policy of the concerns to be a matter of interest to the State warranting public intervention. The extension of the private enterprises or the great organisations to comprehensive monopolies, and the inability of the latter to settle their conflicting interests by the methods of the free market, will easily lead towards a capitalistic, or semi- or absolutely-socialistic joint economy—in any case an economic order in which the conflicts between

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the interests of the individuals are not determined automatically, but require a conscious action and guidance. We shall, consequently, proceed no further, since a joint economy raises quite new problems—the questions of the right political principles and of the best enforcement thereof.

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